SEQUENCE LISTING

<110> BAVARIAN NORDIC A/S

<120> COMPOSITIONS AND METHODS FOR ENHANCING THE STABILITY OF TRANSGENES IN POXVIRUSES

<130> BNIT0011PCT

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cagagaagtt cagtgcccag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

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gctcctgata ctcgtccagc tcctggcagt actgcaccac cggcacatgg cgtaacatca 420

gcacctgata caagacctgc acctggatct acagcgccgc ctgcgcacgg agtgacatcg 480

gcgcccgata cgcgccccgc tcccggtagc accgcaccgc ccgcccacgg tgttacaagt 540

gcacccgata cccggccggc acccggaagt accgctccac ctgcacacgg ggtcacaagc 600

gcgccagaca ctcgacctgc gccagggtcg actgcccctc cggcgcatgg tgtgacctca 660

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acggtacctc ctctcacctc ctccaatcac agcacttctc cccagttgtc tactggggtc 900

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cccagcaccg actactacca agagctgcag agagacattt ctgaaatgtt tttgcagatt 1020

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gatacctacc atcctatgag cgagtacccc acctaccaca cccatgggcg ctatgtgccc 1440

cctagcagta ccgatcgtag cccctatgag aaggtttctg caggtaatgg tggcagcagc 1500

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<212> DNA
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<223> MUC1 coding sequence from mBN336

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cagagaagtt cagtgcccag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc tccaccactc agggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacctcg 300

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gcaccagata cgaggccagc gcctgctagc actctggtgc acaacggcac ctctgccagg 540

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acggtacctc ctctcacctc ctccaatcac agcacttctc cccagttgtc tactggggtc 720

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cccagcaccg actactacca agagctgcag agagacattt ctgaaatgtt tttgcagatt 840

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<210> 3
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 coding sequence from mBN373

<400> 3
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gttacgggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagagaagtt cagtgcccag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc tccaccactc agggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacctcg 300

gtaccagtta ctagaccagc tttaggctac ctggcgccac cggctcatgg cgttacatcg 360

tatttggaca ctcgaccggc accagttagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaacggcac ctctgccagg 540

gctaccacaa ccccagccag caagagcact ccattctcaa ttcccagcca ccactctgat 600

actcctacca cccttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc ctctcacctc ctccaatcac agcacttctc cccagttgtc tactggggtc 720

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cccagcaccg actactacca agagctgcag agagacattt ctgaaatgtt tttgcagatt 840

tataaacaag ggggttttct gggcctctcc aatattaagt tcaggccagg atctgtggtg 900

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cctagcagtc tgttccgtag cccctatgag aaggtttctg caggtaatgg tggcagctac 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 4
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 coding sequence from mBN398 and mBN400

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gttacaggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagcggagtt cagtgcctag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc agcaccactc aaggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacatcg 300

gtaccagtta ctagaccagc tttaggcagt actgcgccac cggctcatgg cgttacatcg 360

gcacctgaca ctcgaccggc accaggtagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaatggcac atctgccagg 540

gctaccacaa ctccagccag caagagcact ccattctcaa ttccaagcca tcactctgat 600

actcctacca cacttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc cactcacctc atccaatcac agcacttctc ctcagttgtc tactggagtc 720

tccttctttt tcctgtcctt tcacatttca aacttgcagt tcaattcttc cctggaagat 780

cccagcaccg actactacca agagctgcag agagacattt ctgagatgtt cttgcagatt 840

tataaacaag gtggattcct tggcctctct aatattaagt tcaggccagg atctgtggtc 900

gtacagttga ctctggcctt cagagaaggt accatcaatg tccacgacgt ggagacacag 960

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cctagcagta ccgatcgtag tccctatgag aaagtttctg caggtaatgg tggcagcagc 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 5
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 nucleic acid sequence from mBN420

<400> 5
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gttacaggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagcggagtt cagtgcctag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc agcaccactc aaggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacatcg 300

gtaccagtta ctagaccagc tttaggctac ctggcgccac cggctcatgg cgttacatcg 360

tatttggaca ctcgaccggc accagttagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaatggcac atctgccagg 540

gctaccacaa ctccagccag caagagcact ccattctcaa ttccaagcca tcactctgat 600

actcctacca cacttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc cactcacctc atccaatcac agcacttctc ctcagttgtc tactggagtc 720

tccttctttt tcctgtcctt tcacatttca aacttgcagt tcaattcttc cctggaagat 780

cccagcaccg actactacca agagctgcag agagacattt ctgagatgtt cttgcagatt 840

tataaacaag gtggattcct tggcctctct aatattaagt tcaggccagg atctgtggtc 900

gtacagttga ctctggcctt cagagaaggt accatcaatg tccacgacgt ggagacacag 960

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gttagtgatg tgccatttcc tttctctgcc cagtctggag ctggtgtgcc aggctggggc 1080

atcgcgctgc tcgtgttggt ctgtgttctg gtttacctgg ccattgtcta tctcattgcc 1140

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cctagcagtc tgttccgtag tccctatgag aaagtttctg caggtaatgg tggcagctac 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 6
<211> 515
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC 1 amino acid sequence as found in PANVAC

<400> 6

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Gly Glu Lys Glu Thr Ser Ala Thr Gln Arg Ser Ser Val Pro Ser Ser
        35                  40                  45

Thr Glu Lys Asn Ala Val Ser Met Thr Ser Ser Val Leu Ser Ser His
    50                  55                  60

Ser Pro Gly Ser Gly Ser Ser Thr Thr Gln Gly Gln Asp Val Thr Leu
65                  70                  75                  80

Ala Pro Ala Thr Glu Pro Ala Ser Gly Ser Ala Ala Leu Trp Gly Gln
                85                  90                  95

Asp Val Thr Ser Val Pro Val Thr Arg Pro Ala Leu Gly Ser Thr Ala
            100                 105                 110

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        115                 120                 125

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    130                 135                 140

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
145                 150                 155                 160

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
                165                 170                 175

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
            180                 185                 190

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        195                 200                 205
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Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    210                 215                 220

Arg Pro Ala Pro Ala Ser Thr Leu Val His Asn Gly Thr Ser Ala Arg
225                 230                 235                 240

Ala Thr Thr Thr Pro Ala Ser Lys Ser Thr Pro Phe Ser Ile Pro Ser
                245                 250                 255

His His Ser Asp Thr Pro Thr Thr Leu Ala Ser His Ser Thr Lys Thr
            260                 265                 270

Asp Ala Ser Ser Thr His His Ser Thr Val Pro Pro Leu Thr Ser Ser
        275                 280                 285

Asn His Ser Thr Ser Pro Gln Leu Ser Thr Gly Val Ser Phe Phe Phe
    290                 295                 300

Leu Ser Phe His Ile Ser Asn Leu Gln Phe Asn Ser Ser Leu Glu Asp
305                 310                 315                 320

Pro Ser Thr Asp Tyr Tyr Gln Glu Leu Gln Arg Asp Ile Ser Glu Met
                325                 330                 335

Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe Leu Gly Leu Ser Asn Ile
            340                 345                 350

Lys Phe Arg Pro Gly Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg
        355                 360                 365

Glu Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr
    370                 375                 380

Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser
385                 390                 395                 400

Val Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val
                405                 410                 415
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Pro Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala
420 425 430

Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg
435 440 445

Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His
450 455 460

Pro Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly Arg Tyr Val Pro
465 470 475 480

Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val Ser Ala Gly Asn
485 490 495

Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val Ala Ala Thr Ser
500 505 510

Ala Asn Leu
515

<210> 7
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> VNTR #2 coding sequence from PANVAC

<400> 7
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<210> 8
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> VNTR #1 coding sequence from mBN420 and mBN336

<400> 8
ggctacctgg cgccaccggc tcatggcgtt acatcgtatt tggacactcg accggcacca 60

<210> 9
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> VNTR #1 coding sequence from PANVAC

<400> 9
ggtagcacag cacctcctgc tcatggagta actagtgctc ctgatactcg tccagctcct 60

<210> 10
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> VNTR #2 coding sequence from mBN420 and mBN336

<400> 10
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<210> 11
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> VNTR #3 coding sequence from PANVAC

<400> 11
ggatctacag cgccgcctgc gcacggagtg acatcggcgc ccgatacgcg ccccgctccc 60

<210> 12
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> VNTR #3 coding sequence from mBN420 and mBN336

<400> 12
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<210> 13
<211> 2103
<212> DNA
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<223> CEA coding sequence from PANVAC

<400> 13
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acgccgttca atgtcgcaga ggggaaggag gtgcttctac ttgtccacaa tctgccccag 180

catcttttg gctacagctg gtacaaaggt gaaagagtgg atggcaaccg tcaaattata 240

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atatacccca atgcatccct gctgatccag aacatcatcc agaatgacac aggattctac 360

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tacccggaac tccctaagcc ttctattagc tccaataata gtaagcctgt cgaagacaaa 480

gatgccgtcg cttttacatg cgagcccgaa actcaagacg caacatatct ctggtgggtg 540

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<210> 14
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<212> DNA
<213> Artificial Sequence

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<223> CEA coding sequence from mBN373 and mBN420

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aatccacctg cacagtactc ctggctgatt gatggaaaca ttcagcagca tactcaagag 1380

ttatttataa gcaacataac tgagaagaac agcggactct atacttgcca ggccaataac 1440

tcagccagtg gtcacagcag gactacagtt aaaacaataa ctgtttccgc ggagctgccc 1500

aagccctcca tctccagcaa caactccaaa cccgtggagg acaaggatgc tgtggccttc 1560

acctgtgaac ctgaggctca gaacacaacc tacctgtggt gggtaaatgg tcagagcctc 1620

ccagtcagtc ccaggctgca gctgtccaat ggcaacagga ccctcactct attcaatgtc 1680

acaagaaatg acgcaagagc ctatgtatgt ggaatccaga actcagtgag tgcaaaccgc 1740

agtgacccag tcaccctgga tgtcctctat ggaccggaca cacccatcat ttcacctcca 1800

gactcgtctt acctttcggg agcggacctc aacctctcct gccactcggc ctctaaccca 1860

tctccgcagt attcttggcg tatcaatggg ataccgcagc aacacacaca agttctcttt 1920

atcgccaaaa tcacgccaaa taataacggg acctatgcct gttttgtctc taacttggct 1980

actggccgca ataattccat agtcaagagc atcacagtct ctgcatctgg aacttctcct 2040

ggtctctcag ctggagccac tgtcggcatc atgattggag tgctggttgg ggttgctctg 2100

ata 2103

<210> 15
<211> 864
<212> DNA
<213> Artificial Sequence

<220>
<223> Optimized B7.1 coding sequence from mBN373 and mBN420

<400> 15
atgggacaca ccagaaggca gggcacaagc ccatccaagt gtccctacct gaacttcttt 60

cagctcctgg tgctggctgg cctgtcccac ttctgctccg gagtgatcca cgtgaccaag 120

gaggtcaaag aagtcgccac actgagctgc gggcacaatg tgtccgtgga ggaactggct 180

cagacacgga tctactggca gaaagagaag aaaatggtgc tgaccatgat gtccggcgac 240

atgaacatct ggcctgagta caagaaccgc accatcttcg acatcaccaa caatctgagc 300

atcgtgatcc tcgctctgag gccctccgac gagggaacat acgagtgcgt ggtgctgaag 360

tacgagaagg acgccttcaa acgcgagcac ctggccgagg tcaccctgtc cgtgaaggca 420

gacttcccaa cacccagcat cagcgacttc gagatcccta ccagcaacat ccggcggatt 480

atctgcagca cctccggagg cttcccagag cctcacctga gctggctcga gaacggcgaa 540

gagctcaacg ccatcaacac taccgtgtcc caggaccctg agacagagct gtacgctgtg 600

agcagcaagc tggacttcaa catgaccaca aatcacagct ttatgtgcct catcaagtac 660

ggccacctga gagtgaatca gaccttcaac tggaatacaa ccaagcagga acacttccca 720

gacaatctcc tgccctcctg ggctatcaca ctgattagcg tgaatggcat cttcgtgatc 780

tgctgtctga cctactgctt cgctcccaga tgccgggagc gcaggagaaa cgagaggctg 840

agacgggaat ccgtgaggcc cgtg 864

<210> 16
<211> 864
<212> DNA
<213> Artificial Sequence

<220>
<223> B7.1 coding sequence from PANVAC

<400> 16
atgggccaca cacggaggca gggaacatca ccatccaagt gtccatacct caatttcttt 60

cagctcttgg tgctggctgg tctttctcac ttctgttcag gtgttatcca cgtgaccaag 120

gaagtgaaag aagtggcaac gctgtcctgt ggtcacaatg tttctgttga agagctggca 180

caaactcgca tctactggca aaaggagaag aaaatggtgc tgactatgat gtctggagac 240

atgaatatat ggcccgagta caagaaccgg accatctttg atatcactaa taacctctcc 300

attgtgatcc tggctctgcg cccatctgac gagggcacat acgagtgtgt tgttctgaag 360

tatgaaaaag acgctttcaa gcgggaacac ctggctgaag tgacgttatc agtcaaagct 420

gacttcccta cacctagtat atctgacttt gaaattccaa cttctaatat tagaaggata 480

atttgctcaa cctctggagg ttttccagag cctcacctct cctggttgga aaatggagaa 540

gaattaaatg ccatcaacac aacagtttcc caagatcctg aaactgagct ctatgctgtt 600

agcagcaaac tggatttcaa tatgacaacc aaccacagct tcatgtgtct catcaagtat 660

ggacatttaa gagtgaatca gaccttcaac tggaatacaa ccaagcaaga gcattttcct 720

gataacctgc tcccatcctg ggccattacc ttaatctcag taaatggaat tttcgtgata 780

tgctgcctga cctactgctt tgccccacgc tgcagagaga gaaggaggaa tgagagattg 840

agaagggaaa gtgtacgccc tgta 864

<210> 17
<211> 864
<212> DNA
<213> Artificial Sequence

<220>
<223> Optimized B7.1 coding sequence from mBN336

<400> 17
atgggccaca ccagaaggca gggcaccagc ccctccaagt gcccctacct gaacttcttc 60

cagctcctgg tgctggccgg cctgtcccac ttctgctccg gcgtgatcca cgtgaccaaa 120

gaggtcaaag aagtcgccac actgagctgc ggccacaatg tgtccgtgga ggaactggct 180

cagacccgga tctactggca gaaagaaaag aaaatggtgc tgaccatgat gtccggcgac 240

atgaacatct ggcctgagta caagaaccgc accatcttcg acatcaccaa caacctgagc 300

atcgtgatcc tcgccctgag gccctccgac gagggcacct acgagtgcgt ggtgctgaag 360

tacgagaagg acgccttcaa gcgcgagcac ctggccgagg tcaccctgtc cgtgaaggcc 420

gacttcccaa cccccagcat cagcgacttc gagatcccaa ccagcaacat ccggcggatc 480

atctgcagca cctccggcgg cttccccgag cctcacctga gctggctcga gaacggcgaa 540

gaactcaacg ccatcaacac taccgtgtcc caggaccccg agacagagct gtacgccgtg 600

agcagcaagc tggacttcaa catgaccaca aaccacagct ttatgtgcct catcaagtac 660

ggccacctga gagtgaatca gaccttcaac tggaacacca ccaagcagga acacttcccc 720

gacaatctgc tgccctcctg ggctatcacc ctgattagcg tgaatggcat cttcgtgatc 780

tgctgtctga cctactgctt cgcccccaga tgccgggagc ggcggagaaa cgagcggctg 840

cggcgggaat ccgtgaggcc cgtg 864

<210> 18
<211> 1596
<212> DNA
<213> Artificial Sequence

<220>
<223> Optimized ICAM-1 coding sequence from mBN373 and mBN420

<400> 18
atggctccta gctcacctag accagctctg cctgccctgc tcgtgctgct cggagctctg 60

ttccctggac caggcaacgc ccagaccagc gtgtcaccta gcaaagtgat tctgcccaga 120

ggaggctccg tgctggtcac atgtagcacc agctgcgacc agcccaagct cctcgggatc 180

gagacacctc tgcccaagaa agagctgctc ctgccaggca acaatcggaa agtgtacgag 240

ctgtccaatg tgcaggaaga tagccagccc atgtgctact ccaactgtcc cgacggccag 300

agcaccgcca agacctttct gaccgtgtac tggacacctg agcgggtgga actggctcca 360

ctgcccagct ggcagccagt gggcaagaat ctgaccctgc ggtgccaggt ggaaggcgga 420

gctcccagag ccaacctgac agtggtgctc ctgagaggcg agaaagagct gaagcgggaa 480

cctgccgtgg gcgagccagc cgaagtgacc acaaccgtgc tcgtgcggag ggaccaccac 540

ggagccaact tcagctgcag aaccgagctg gacctcaggc cacagggcct ggaactgttc 600

gagaacacca gcgctcccta ccagctccag accttcgtgc tcccagcaac accacctcag 660

ctggtgtcac ctcgggtgct ggaagtggac acccagggca cagtcgtgtg cagcctggac 720

ggcctgtttc ccgtgtccga agctcaggtc cacctggctc tcggagacca gagactgaac 780

cctaccgtga cctacggcaa tgacagcttc agcgccaagg cctccgtgtc cgtgaccgcc 840

gaggatgaag gcacccagag gctgacatgc gccgtgattc tgggcaacca gagccaggaa 900

accctgcaga ccgtcaccat ctatagcttc cctgcaccta atgtgatcct gacaaagccc 960

gaggtgtccg agggcactga agtgaccgtg aaatgcgagg cccaccctag agccaaagtg 1020

accctgaacg gcgtgccagc ccagccactc ggaccaagag cacagctcct gctgaaagcc 1080

acacccgagg ataacggccg gtccttctcc tgcagcgcta ccctcgaagt ggccggacag 1140

ctgatccaca agaaccagac cagagagctg agagtgctgt acggccctag actggacgag 1200

agagactgcc caggcaactg gacctggccc gagaactccc agcagacacc catgtgccag 1260

gcttggggca acccactgcc agagctgaag tgcctgaagg acggcacctt ccctctgccc 1320

atcggcgagt ccgtgacagt gaccagggac ctggaaggca cctacctgtg cagagccaga 1380

tccacacagg gcgaagtgac acgggaggtc accgtgaatg tgctgtcacc tcgctacgag 1440

atcgtgatca tcaccgtggt cgctgcagct gtgatcatgg gcacagccgg actgagcaca 1500

tacctgtaca accggcagcg gaagatcaag aagtacaggc tgcagcaggc ccagaaaggc 1560

acacccatga agcccaacac ccaggccact cctccc 1596

<210> 19
<211> 1596
<212> DNA
<213> Artificial Sequence

<220>
<223> ICAM-1 coding sequence from PANVAC

<400> 19
atggctccca gcagcccccg gcccgcgctg cccgcactcc tggtcctgct cggggctctg 60

ttcccaggac ctggcaatgc ccagacatct gtgtcccccct caaaagtcat cctgccccgg 120

ggaggctccg tgctggtgac atgcagcacc tcctgtgacc agcccaagtt gttgggcata 180

gagaccccgt tgcctaaaaa ggagttgctc ctgcctggga acaaccggaa ggtgtatgaa 240

ctgagcaatg tgcaagaaga tagccaacca atgtgctatt caaactgccc tgatgggcag 300

tcaacagcta aaaccttcct caccgtgtac tggactccag aacgggtgga actggcaccc 360

ctcccctctt ggcagccagt gggcaagaac cttaccctac gctgccaggt ggagggtggg 420

gcaccccggg ccaacctcac cgtggtgctg ctccgtgggg agaaggagct gaaacgggag 480

ccagctgtgg gggagcccgc tgaggtcacg accacggtgc tggtgaggag agatcaccat 540

ggagccaatt tctcgtgccg cactgaactg gacctgcggc cccaagggct ggagctgttt 600

gagaacacct cggcccccta ccagctccag acctttgtcc tgccagcgac tcccccacaa 660

cttgtcagcc cccgggtcct agaggtggac acgcagggga ccgtggtctg ttccctggac 720

gggctgttcc cagtctcgga ggcccaggtc cacctggcac tgggggacca gaggttgaac 780

cccacagtca cctatggcaa cgactccttc tcggccaagg cctcagtcag tgtgaccgca 840

gaggacgagg gcacccagcg gctgacgtgt gcagtaatac tggggaacca gagccaggag 900

acactgcaga cagtgaccat ctacagcttt ccggcgccca acgtgattct gacgaagcca 960

gaggtctcag aagggaccga ggtgacagtg aagtgtgagg cccaccctag agccaaggtg 1020

acgctgaatg gggttccagc ccagccactg ggcccgaggg cccagctcct gctgaaggcc 1080

accccagagg acaacgggcg cagcttctcc tgctctgcaa ccctggaggt ggccggccag 1140

cttatacaca agaaccagac ccgggagctt cgtgtcctgt atggcccccg actggacgag 1200

agggattgtc cgggaaactg gacgtggcca gaaaattccc agcagactcc aatgtgccag 1260

gcttggggga acccattgcc cgagctcaag tgtctaaagg atggcacttt cccactgccc 1320

atcggggaat cagtgactgt cactcgagat cttgagggca cctacctctg tcgggccagg 1380

agcactcaag gggaggtcac ccgcgaggtg accgtgaatg tgctctcccc ccggtatgag 1440

attgtcatca tcactgtggt agcagccgca gtcataatgg gcactgcagg cctcagcacg 1500

tacctctata accgccagcg gaagatcaag aaatacagac tacaacaggc ccaaaaaggg 1560

acccccatga aaccgaacac acaagccacg cctccc 1596

<210> 20
<211> 1596
<212> DNA
<213> Artificial Sequence

<220>
<223> Optimized ICAM-1 coding sequence from mBN336

<400> 20

atggccccta gcagccctag accagccctg cctgccctgc tggtgctgct gggcgctctg 60

ttccccggac ccggcaacgc ccagaccagc gtgtccccca gcaaagtgat tctgcccaga 120

ggcggctccg tgctggtcac atgtagcacc agctgcgacc agcccaagct cctcgggatc 180

gagacacccc tgcccaagaa agagctgctg ctgcccggca acaaccggaa agtgtacgag 240

ctgtccaatg tgcaggaaga tagccagccc atgtgctact ccaactgccc cgacggccag 300

agcaccgcca agacctttct gaccgtgtac tggacccccg agcgggtgga actggcccca 360

ctgcccagct ggcagcccgt gggcaagaat ctgaccctgc ggtgccaggt ggaaggcgga 420

gcccccagag ccaacctgac agtggtgctc ctgcggggcg aaaaagagct gaagcgggag 480

cctgccgtgg gcgagccagc cgaagtgacc acaaccgtgc tcgtgcggag ggaccaccac 540

ggcgccaact tcagctgcag aaccgagctg gacctcaggc cacagggcct ggaactgttc 600

gagaacacca gcgcccccta ccagctccag accttcgtgc tcccagcaac ccccccctcag 660

ctggtgtccc ctcgggtgct ggaagtggac acccagggca cagtcgtgtg cagcctggac 720

ggcctgtttc ccgtgtccga agctcaggtc cacctggctc tcggggacca gagactgaac 780

cctaccgtga cctacggcaa tgacagcttc agcgccaagg cctccgtgtc cgtgaccgcc 840

gaggatgagg gcacccagag gctgacatgc gccgtgattc tgggcaacca gagccaggaa 900

accctgcaga ccgtcaccat ctatagcttc cctgccccca atgtgatcct gacaaagccc 960

gaggtgtccg agggcactga agtgaccgtg aaatgcgagg cccaccccag ggccaaagtg 1020

accctgaacg gcgtgccagc ccagccactc ggaccaagag cacagctcct gctgaaagcc 1080

acccccgagg ataacggccg gtccttctcc tgcagcgcta ccctcgaagt ggccgggcag 1140

ctgatccaca agaaccagac ccgggagctg agagtgctgt acggccccag actggacgag 1200

agagactgcc ccggcaactg gacctggccc gagaactccc agcagacccc catgtgccag 1260

gcttggggca acccactgcc agagctgaag tgcctgaagg acggcacctt ccctctgccc 1320

atcggcgagt ccgtgacagt gacccgggac ctggaaggca cctacctgtg ccgggccaga 1380

tccacacagg gcgaagtgac acgggaggtc accgtgaatg tgctgtcccc ccgctacgag 1440

atcgtgatca tcaccgtggt cgctgcagct gtgatcatgg gcacagccgg cctgagcaca 1500

tacctgtaca accggcagcg gaagatcaag aagtacaggc tgcagcaggc ccagaaaggc 1560

accccatga agcccaacac ccaggccacc cctccc 1596

<210> 21
<211> 750
<212> DNA
<213> Artificial Sequence

<220>
<223> Optimized LFA-3 coding sequence from mBN373 and mBN420

<400> 21
atggtggctg gctctgatgc agggagagcc ctgggagtgc tgtctgtcgt gtgcctgctg 60

cactgcttcg gcttcatcag ctgcttcagc cagcagatct acggagtggt ctacggcaac 120

gtgaccttcc acgtgcccag caacgtgcct ctgaaagagg tgctctggaa gaaacagaag 180

gacaaggtcg cagagctgga gaacagcgag ttccgggcct tcagcagctt caagaaccgg 240

gtgtacctgg acaccgtgtc cggcagcctg accatctaca acctgaccag cagcgacgag 300

gacgagtacg agatggaaag ccctaacatc accgacacca tgaagttctt tctgtacgtg 360

ctggaaagcc tgcccagccc aacactgacc tgtgccctga ccaacggctc catcgaggtg 420

cagtgcatga ttcccgagca ctacaactcc cacagaggcc tgatcatgta ctcttgggac 480

tgccctatgg aacagtgcaa gcgcaacagc accagcatct acttcaagat ggagaacgac 540

ctccctcaga agatccagtg cacactgagc aatccactgt tcaacaccac atccagcatc 600

atcctgacaa cctgtattcc cagcagtggc cacagcagac acagatacgc cctgatccct 660

attccactgg ccgtgatcac cacatgcatc gtgctgtaca tgaacggcat cctgaagtgc 720

gaccggaagc ccgaccggac caacagcaac 750

<210> 22
<211> 750
<212> DNA
<213> Artificial Sequence

<220>
<223> LFA-3 coding sequence from PANVAC

<400> 22
atggttgctg ggagcgacgc ggggcgggcc ctgggggtcc tcagcgtggt ctgcctgctg 60

cactgctttg gtttcatcag ctgtttttcc caacaaatat atggtgttgt gtatgggaat 120

gtaactttcc atgtaccaag caatgtgcct ttaaaagagg tcctatggaa aaaacaaaag 180

gataaagttg cagaactgga aaattctgaa ttcagagctt tctcatcttt taaaaatagg 240

gtttatttag acactgtgtc aggtagcctc actatctaca acttaacatc atcagatgaa 300

gatgagtatg aaatggaatc gccaaatatt actgatacca tgaagttctt tctttatgtg 360

cttgagtctc ttccatctcc cacactaact tgtgcattga ctaatggaag cattgaagtc 420

caatgcatga taccagagca ttacaacagc catcgaggac ttataatgta ctcatgggat 480

tgtcctatgg agcaatgtaa acgtaactca accagtatat attttaagat ggaaaatgat 540

cttccacaaa aaatacagtg tactcttagc aatccattat ttaatacaac atcatcaatc 600

attttgacaa cctgtatccc aagcagcggt cattcaagac acagatatgc acttataccc 660

ataccattag cagtaattac aacatgtatt gtgctgtata tgaatggtat tctgaaatgt 720

gacagaaaac cagacagaac caactccaat 750

<210> 23
<211> 750
<212> DNA
<213> Artificial Sequence

<220>
<223> Optimized LFA-3 coding sequence from mBN336

<400> 23
atggtggctg gctctgatgc aggcagagcc ctgggcgtgc tgtctgtcgt gtgcctgctg 60

cactgcttcg gcttcatcag ctgcttcagc cagcagatct acggcgtggt gtacggcaac 120

gtgaccttcc acgtgcccag caacgtgcct ctgaaagagg tgctctggaa gaagcagaag 180

gacaaggtcg cagagctgga aaacagcgag ttccgggcct tcagcagctt caagaaccgg 240

gtgtacctgg acaccgtgtc cggcagcctg accatctaca acctgaccag cagcgacgag 300

gacgagtacg agatggaaag ccccaacatc accgacacca tgaagttctt tctgtacgtg 360

ctggaaagcc tgcccagccc caccctgacc tgtgccctga ccaacggctc catcgaggtg 420

cagtgcatga tccccgagca ctacaactcc caccggggcc tgatcatgta ctcttgggac 480

tgccctatgg aaacgtgcaa gcgcaacagc accagcatct acttcaagat ggaaaacgac 540

ctcccccaga aaatccagtg caccctgagc aacccccctgt tcaacaccac ctccagcatc 600

atcctgacca cctgtatccc cagcagcggc cacagcagac acagatacgc cctgatcccc 660

atccccctgg ccgtgatcac cacatgcatc gtgctgtaca tgaacggcat cctgaagtgc 720

gaccggaagc ccgaccggac caacagcaac 750

<210> 24
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 Agonist Epitope

<400> 24

Tyr Leu Ala Pro Pro Ala His Gly Val
1 5

<210> 25
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 agonist epitope

<400> 25

Tyr Leu Asp Thr Arg Pro Ala Pro Val
1 5

<210> 26
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 agonist epitope

<400> 26

Tyr Leu Ala Ile Val Tyr Leu Ile Ala Leu
1 5 10

<210> 27
<211> 10

<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 agonist epitope

<400> 27

Tyr Leu Ile Ala Leu Ala Val Cys Gln Val
1 5 10

<210> 28
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 agonist epitope

<400> 28

Tyr Leu Ser Tyr Thr Asn Pro Ala Val
1 5

<210> 29
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 agonist epitope

<400> 29

Ser Leu Phe Arg Ser Pro Tyr Glu Lys
1 5

<210> 30
<211> 455
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 amino acid sequence as found in mBN336, mBN373, and mBN420

<400> 30

Met Thr Pro Gly Thr Gln Ser Pro Phe Phe Leu Leu Leu Leu Leu Thr
1 5 10 15

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Val Leu Thr Val Val Thr Gly Ser Gly His Ala Ser Ser Thr Pro Gly
            20                  25                  30

Gly Glu Lys Glu Thr Ser Ala Thr Gln Arg Ser Ser Val Pro Ser Ser
        35                  40                  45

Thr Glu Lys Asn Ala Val Ser Met Thr Ser Ser Val Leu Ser Ser His
    50                  55                  60

Ser Pro Gly Ser Gly Ser Ser Thr Thr Gln Gly Gln Asp Val Thr Leu
65                  70                  75                  80

Ala Pro Ala Thr Glu Pro Ala Ser Gly Ser Ala Ala Leu Trp Gly Gln
                85                  90                  95

Asp Val Thr Ser Val Pro Val Thr Arg Pro Ala Leu Gly Tyr Leu Ala
            100                 105                 110

Pro Pro Ala His Gly Val Thr Ser Tyr Leu Asp Thr Arg Pro Ala Pro
        115                 120                 125

Val Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    130                 135                 140

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
145                 150                 155                 160

Ala Pro Asp Thr Arg Pro Ala Pro Ala Ser Thr Leu Val His Asn Gly
                165                 170                 175

Thr Ser Ala Arg Ala Thr Thr Thr Pro Ala Ser Lys Ser Thr Pro Phe
            180                 185                 190

Ser Ile Pro Ser His His Ser Asp Thr Pro Thr Thr Leu Ala Ser His
        195                 200                 205

Ser Thr Lys Thr Asp Ala Ser Ser Thr His His Ser Thr Val Pro Pro
    210                 215                 220
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Leu Thr Ser Ser Asn His Ser Thr Ser Pro Gln Leu Ser Thr Gly Val
225                 230                 235                 240

Ser Phe Phe Phe Leu Ser Phe His Ile Ser Asn Leu Gln Phe Asn Ser
                245                 250                 255

Ser Leu Glu Asp Pro Ser Thr Asp Tyr Tyr Gln Glu Leu Gln Arg Asp
            260                 265                 270

Ile Ser Glu Met Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe Leu Gly
        275                 280                 285

Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val Val Gln Leu Thr
    290                 295                 300

Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp Val Glu Thr Gln
305                 310                 315                 320

Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile
                325                 330                 335

Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser
            340                 345                 350

Gly Ala Gly Val Pro Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys
        355                 360                 365

Val Leu Val Tyr Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys
    370                 375                 380

Gln Val Arg Arg Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg
385                 390                 395                 400

Asp Thr Tyr His Pro Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly
                405                 410                 415

Arg Tyr Val Pro Pro Ser Ser Leu Phe Arg Ser Pro Tyr Glu Lys Val
            420                 425                 430
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Ser Ala Gly Asn Gly Gly Ser Tyr Leu Ser Tyr Thr Asn Pro Ala Val
435 440 445

Ala Ala Thr Ser Ala Asn Leu
450 455

<210> 31
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 coding sequence for mBN336 w/o agonist epitopes from WO 2013/103658

<400> 31
atgacaccgg gcacccagtc tcctttcttc ctgctgctgc tcctcacagt gcttacagtt 60

gttacgggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagagaagtt cagtgcccag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc tccaccactc agggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacctcg 300

gtaccagtta ctagaccagc tttaggcagc acagcgccac cggctcatgg cgttacatcg 360

gctcctgaca ctcgaccggc accaggcagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaacggcac ctctgccagg 540

gctaccacaa ccccagccag caagagcact ccattctcaa ttcccagcca ccactctgat 600

actcctacca cccttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc ctctcacctc ctccaatcac agcacttctc cccagttgtc tactggggtc 720

tctttctttt tcctgtcttt tcacatttca aacctccagt ttaattcctc tctggaagat 780

cccagcaccg actactacca agagctgcag agagacattt ctgaaatgtt tttgcagatt 840

tataaacaag ggggttttct gggcctctcc aatattaagt tcaggccagg atctgtggtg 900

gtacagttga ctctggcctt ccgagaaggt accatcaatg tccacgacgt ggagacacag 960

ttcaatcagt ataaaacgga agcagcctct cgatataacc tgacgatctc agacgtcagc 1020

gtgagtgatg tgccatttcc tttctctgcc cagtctgggg ctggggtgcc aggctggggc 1080

atcgcgctgc tggtgctggt ctgtgttctg gttgcactgg ccattgtcta tctcattgcc 1140

ttggctgtct gtcagtgccg ccgaaagaac tacgggcagc tggacatctt tccagcccgg 1200

gatacctacc atcctatgag cgagtacccc acctaccaca cccatgggcg ctatgtgccc 1260

cctagcagta ccgatcgtag cccctatgag aaggtttctg caggtaatgg tggcagcagt 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 32
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 coding sequence for mBN373 w/o agonist epitopes from WO 2013/103658

<400> 32
atgacaccgg gcacccagtc tcctttcttc ctgctgctgc tcctcacagt gcttacagtt 60

gttacgggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagagaagtt cagtgcccag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc tccaccactc agggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacctcg 300

gtaccagtta ctagaccagc tttaggcagc acagcgccac cggctcatgg cgttacatcg 360

gctcctgaca ctcgaccggc accaggcagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaacggcac ctctgccagg 540

gctaccacaa ccccagccag caagagcact ccattctcaa ttcccagcca ccactctgat 600

actcctacca cccttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc ctctcacctc ctccaatcac agcacttctc cccagttgtc tactggggtc 720

tctttctttt tcctgtcttt tcacatttca aacctccagt ttaattcctc tctggaagat 780

cccagcaccg actactacca agagctgcag agagacattt ctgaaatgtt tttgcagatt 840

tataaacaag ggggttttct gggcctctcc aatattaagt tcaggccagg atctgtggtg 900

gtacagttga ctctggcctt ccgagaaggt accatcaatg tccacgacgt ggagacacag 960

ttcaatcagt ataaaacgga agcagcctct cgatataacc tgacgatctc agacgtcagc 1020

gtgagtgatg tgccatttcc tttctctgcc cagtctgggg ctggggtgcc aggctggggc 1080

atcgcgctgc tggtgctggt ctgtgttctg gttgcactgg ccattgtcta tctcattgcc 1140

ttggctgtct gtcagtgccg ccgaaagaac tacgggcagc tggacatctt tccagcccgg 1200

gatacctacc atcctatgag cgagtacccc acctaccaca cccatgggcg ctatgtgccc 1260

cctagcagta ccgatcgtag cccctatgag aaggtttctg caggtaatgg tggcagcagt 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 33
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 coding sequence for mBN420 w/o agonist epitopes from WO 2013/103658

<400> 33
atgacacctg gcactcagtc accattcttc ctgctgttac tcttgacagt gcttacagtt 60

gttacaggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagcggagtt cagtgcctag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc agcaccactc aaggacagga tgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtcacatcg 300

gtaccagtta ctagaccagc tttaggcagc acagcgccac cggctcatgg cgttacatcg 360

gctcctgaca ctcgaccggc accaggcagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaatggcac atctgccagg 540

gctaccacaa ctccagccag caagagcact ccattctcaa ttccaagcca tcactctgat 600

actcctacca cacttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc cactcacctc atccaatcac agcacttctc ctcagttgtc tactggagtc 720

tccttctttt tcctgtcctt tcacatttca aacttgcagt tcaattcttc cctggaagat 780

cccagcaccg actactacca agagctgcag agagacattt ctgagatgtt cttgcagatt 840

tataaacaag gtggattcct tggcctctct aatattaagt tcaggccagg atctgtggtc 900

gtacagttga ctctggcctt cagagaaggt accatcaatg tccacgacgt ggagacacag 960

ttcaatcagt ataagacgga agcagcctca cgatataacc tgacgatctc agacgtcagc 1020

gttagtgatg tgccatttcc tttctctgcc cagtctggag ctggtgtgcc aggctggggc 1080

atcgcgctgc tcgtgttggt ctgtgttctg gttgcactgg ccattgtcta tctcattgcc 1140

ttggctgttt gtcagtgcag acgcaagaac tacggacagc tggacatctt tccagctcgg 1200

gatacctacc atcctatgag cgagtaccct acctaccaca cacatggtcg ctatgtgcca 1260

cctagcagta ccgatcgtag tccctatgag aaagtttctg caggtaatgg tggcagcagt 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 34
<211> 1365
<212> DNA
<213> Artificial Sequence

<220>
<223> MUC1 coding sequence for mBN optimized w/o agonist epitopes from WO 2013/103658

<400> 34
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gttacaggtt ctggtcatgc aagctctacc ccaggtggag aaaaggagac ttcggctacc 120

cagcggagtt cagtgcctag ctctactgag aagaatgctg tgagtatgac aagctccgta 180

ctctccagcc acagcccagg ttcaggctcc agcaccactc aaggacagga cgtcactctg 240

gcaccggcca cggaaccagc ttcaggttca gctgccttgt ggggacagga tgtgacatcg 300

gtaccagtta ctagaccagc tttaggcagc acagcgccac cggctcatgg cgttacatcg 360

gctcctgaca ctcgaccggc accaggcagc acagcacctc ccgcacacgg tgtaactagc 420

gcgcctgata cacgtcccgc tcccggatct accgctccgc cagcgcacgg agtgacgtca 480

gcaccagata cgaggccagc gcctgctagc actctggtgc acaatggcac atctgccagg 540

gctaccacaa ctccagccag caagagcact ccattctcaa ttccaagcca tcactctgat 600

actcctacca cacttgccag ccatagcacc aagactgatg ccagtagcac tcaccatagc 660

acggtacctc cactcacctc atccaatcac agcacttctc ctcagttgtc tactggagtc 720

tccttctttt tcctgtcctt tcacatttca aacttgcagt tcaattcttc cctggaagat 780

cccagcaccg actactacca agagctgcag agagacattt ctgagatgtt cttgcagatt 840

tataaacaag gtggattcct tggcctctct aatattaagt tcaggccagg atctgtggtc 900

gtacagttga ctctggcctt cagagaaggt accatcaatg tccacgacgt ggagacacag 960

ttcaatcagt ataagacgga agcagcctca cgatataacc tgacgatctc agacgtcagc 1020

gttagtgatg tgccatttcc tttctctgcc cagtctggag ctggtgtgcc aggctggggc 1080

atcgcgctgc tcgtgttggt ctgtgttctg gttgcactgg ccattgtcta tctcattgcc 1140

ttggctgttt gtcagtgcag acgcaagaac tacggacagc tggacatctt tccagctcgg 1200

gatacctacc atcctatgag cgagtaccct acctaccaca cacatggtcg ctatgtgcca 1260

cctagcagta ccgatcgtag tccctatgag aaagtttctg caggtaatgg tggcagcagt 1320

ctctcttaca caaacccagc agtggcagcc acttctgcca acttg 1365

<210> 35
<211> 455
<212> PRT
<213> Artificial Sequence

<220>
<223> MUC1 amino acid from mBN336/mBN373/mBN420 w/o agonist epitopes from WO 2013/103658

<400> 35

Met Thr Pro Gly Thr Gln Ser Pro Phe Phe Leu Leu Leu Leu Leu Thr
1 5 10 15

Val Leu Thr Val Val Thr Gly Ser Gly His Ala Ser Ser Thr Pro Gly
20 25 30

Gly Glu Lys Glu Thr Ser Ala Thr Gln Arg Ser Ser Val Pro Ser Ser
35 40 45

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Thr Glu Lys Asn Ala Val Ser Met Thr Ser Ser Val Leu Ser Ser His
    50                  55                  60

Ser Pro Gly Ser Gly Ser Ser Thr Thr Gln Gly Gln Asp Val Thr Leu
65                  70                  75                  80

Ala Pro Ala Thr Glu Pro Ala Ser Gly Ser Ala Ala Leu Trp Gly Gln
                85                  90                  95

Asp Val Thr Ser Val Pro Val Thr Arg Pro Ala Leu Gly Ser Thr Ala
            100                 105                 110

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        115                 120                 125

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    130                 135                 140

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
145                 150                 155                 160

Ala Pro Asp Thr Arg Pro Ala Pro Ala Ser Thr Leu Val His Asn Gly
                165                 170                 175

Thr Ser Ala Arg Ala Thr Thr Thr Pro Ala Ser Lys Ser Thr Pro Phe
            180                 185                 190

Ser Ile Pro Ser His His Ser Asp Thr Pro Thr Thr Leu Ala Ser His
        195                 200                 205

Ser Thr Lys Thr Asp Ala Ser Ser Thr His His Ser Thr Val Pro Pro
    210                 215                 220

Leu Thr Ser Ser Asn His Ser Thr Ser Pro Gln Leu Ser Thr Gly Val
225                 230                 235                 240

Ser Phe Phe Phe Leu Ser Phe His Ile Ser Asn Leu Gln Phe Asn Ser
                245                 250                 255
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Ser Leu Glu Asp Pro Ser Thr Asp Tyr Tyr Gln Glu Leu Gln Arg Asp
            260                 265                 270

Ile Ser Glu Met Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe Leu Gly
        275                 280                 285

Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val Val Gln Leu Thr
    290                 295                 300

Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp Val Glu Thr Gln
305                 310                 315                 320

Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile
                325                 330                 335

Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser
            340                 345                 350

Gly Ala Gly Val Pro Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys
        355                 360                 365

Val Leu Val Ala Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys
    370                 375                 380

Gln Cys Arg Arg Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg
385                 390                 395                 400

Asp Thr Tyr His Pro Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly
                405                 410                 415

Arg Tyr Val Pro Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val
            420                 425                 430

Ser Ala Gly Asn Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val
        435                 440                 445

Ala Ala Thr Ser Ala Asn Leu
    450                 455
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