SEQUENCE LISTING

<110> UCB Pharma S.A.

<120> Antibodies capable of neutralising the major exotoxind TcdA and TcdB of Clostridium difficile

<130> G0159-WO

<150> US 61/535,532
<151> 2011-09-16

<150> US 61/638,731
<151> 2012-04-26

<160> 194

<170> PatentIn version 3.5

<210> 1
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

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Gln Ala Ser Gln Ser Ile Ser Asn Ala Leu Ala
1 5 10

<210> 2
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<220>
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<400> 2

Ser Ala Ser Ser Leu Ala Ser
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<210> 3
<211> 12
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<220>
<223> Antibody CDR

<400> 3

Gln Tyr Thr His Tyr Ser His Thr Ser Lys Asn Pro
1 5 10

<210> 4
<211> 10

<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 4

Gly Phe Thr Ile Ser Ser Tyr Tyr Met Ser
1 5 10

<210> 5
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 5

Ile Ile Ser Ser Gly Gly His Phe Thr Trp Tyr Ala Asn Trp Ala Lys
1 5 10 15

Gly

<210> 6
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 6

Ala Tyr Val Ser Gly Ser Ser Phe Asn Gly Tyr Ala Leu
1 5 10

<210> 7
<211> 110
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region

<400> 7

Asp Pro Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Ser Asn Ala
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile

35 40 45

Tyr Ser Ala Ser Ser Leu Ala Ser Gly Val Pro Ser Arg Phe Lys Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Tyr Thr His Tyr Ser His Thr
85 90 95

Ser Lys Asn Pro Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 8
<211> 330
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding variable region of anti-TcdA antibody 922.g1

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gaccctgtga tgacccagag tccgagcact ctttctgcct ccgtgggaga ccgcgtgacc 60

attacatgtc aggcttcaca aagtatctcc aatgctctgg cctggtatca gcagaaaccc 120

ggcaaagccc ctaagctgct catctactct gcatcaagcc tggctagcgg cgtgccaagc 180

cgattcaagg ggagcggttc tggcactgag tttacgctga ccatcagtag cttgcagcct 240

gacgattttg caacctatta ctgccagtac acacactact cccatacatc taaaaaccca 300

ttcggagggg gtactaaggt cgaaataaag 330

<210> 9
<211> 119
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 922

<400> 9

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 Phe Thr Ile Ser Ser Tyr
20 25 30

Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Ile Ile Ser Ser Gly Gly His Phe Thr Trp Tyr Ala Asn Trp Ala
50 55 60

Lys Gly Arg Phe Thr Ile Ser Ser Asp Ser Thr Thr Val Tyr Leu Gln
65 70 75 80

Met Asn Ser Leu Arg Asp Glu Asp Thr Ala Thr Tyr Phe Cys Ala Arg
85 90 95

Ala Tyr Val Ser Gly Ser Ser Phe Asn Gly Tyr Ala Leu Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser
115

<210> 10
<211> 357
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding variable region of anti-TcdA antibody 922 (heavy chain variable region)

<400> 10
gaagtgcaat tggtggaaag tggcggagga ctggtgcaac ccgggggtag tctgcgactg 60

agctgtgctg cctccggctt taccattagc tcctactata tgagctgggt tcgacaggcc 120

cctggaaaag gactcgaatg gatcggcatc atatcttccg gtgggcattt cacctggtac 180

gcaaactggg ctaaggggag attcacgatt agcagcgact ccacaaccgt gtacctgcaa 240

atgaacagcc tgagggatga ggacactgcc acatatttct gcgcacgcgc ttacgtgagc 300

ggaagctcat ttaatggcta tgcactgtgg gggcaaggaa cactcgtgac tgtctcg 357

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

<220>
<223> Antibody CDR

<400> 11

Gln Ala Ser Gln Ser Ile Ser Asn Tyr Leu Ala
1 5 10

<210> 12
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 12

Ser Ala Ser Thr Leu Ala Ser
1 5

<210> 13
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 13

Gln Tyr Ser His Tyr Gly Thr Gly Val Phe Gly Ala
1 5 10

<210> 14
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 14

Ala Phe Ser Leu Ser Asn Tyr Tyr Met Ser
1 5 10

<210> 15
<211> 18
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 15

Ile Ile Ser Ser Gly Ser Asn Ala Leu Lys Trp Tyr Ala Ser Trp Pro
1 5 10 15

Lys Gly

<210> 16
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 16

Asn Tyr Val Gly Ser Gly Ser Tyr Tyr Gly Met Asp Leu
1 5 10

<210> 17
<211> 110
<212> PRT
<213> Artificial

<220>
<223> Anitbody ariable region of anti-TcdA antibody 923

<400> 17

Asp Val Val Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Ser Asn Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys Leu Leu Ile
35 40 45

Tyr Ser Ala Ser Thr Leu Ala Ser Gly Val Pro Ser Arg Phe Lys Gly
50 55 60

Ser Gly Ser Gly Thr Gln Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Val Ala Thr Tyr Tyr Cys Gln Tyr Ser His Tyr Gly Thr Gly
85 90 95

Val Phe Gly Ala Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 18
<211> 330
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody 923.g1

<400> 18
gacgtcgtga tgactcagag cccatctagt ctgagcgcta gcgtcggaga ccgagtcaca 60

attacctgtc aagcctccca gagcatctcc aactacctgg cctggtacca acagaaacct 120

ggcaaggtgc ccaagctgct gatctatagt gcttccacac tcgcaagcgg cgttccgtca 180

cgctttaagg gatctggctc tggcactcag ttcaccttga cgatctcaag cctgcagcca 240

gaagatgtgg ccacctatta ctgccagtat tcccactacg ggactggggt gttcggtgcc 300

tttggaggtg ggaccaaagt ggagataaag 330

<210> 19
<211> 120
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 923

<400> 19

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 Ala Phe Ser Leu Ser Asn Tyr
20 25 30

Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Ile Ile Ser Ser Gly Ser Asn Ala Leu Lys Trp Tyr Ala Ser Trp
50 55 60

Pro Lys Gly Arg Phe Thr Ile Ser Lys Asp Ser Thr Thr Val Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Thr Tyr Phe Cys Ala
85 90 95

Arg Asn Tyr Val Gly Ser Gly Ser Tyr Tyr Gly Met Asp Leu Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser
115 120

<210> 20
<211> 360
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody 923.g1

<400> 20
gaagttcaac ttgtggaatc tggaggcggg ctcgtgcagc ctggtggaag ccttagactg 60

agctgcgctg catccgcatt ttccctgtcc aactactaca tgagctgggt gcgacaagca 120

ccaggcaagg gactggaatg gattggcatc ataagctccg gttccaatgc cctgaaatgg 180

tacgcatcat ggccgaaagg ccgctttacc ataagcaagg actccaccac cgtctatctg 240

cagatgaact cattgcgtgc cgaggacact gcaacgtact tctgtgctcg caactacgtg 300

ggaagcggat cttattatgg catggatctg tggggacaag gtacactcgt gaccgtctcg 360

<210> 21
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 21

Gln Ala Ser Gln Ser Ile Ser Ser Tyr Phe Ser
1 5 10

<210> 22
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 22

Gly Ala Ser Thr Leu Ala Ser
1 5

<210> 23
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 23

Gln Cys Thr Asp Tyr Ser Gly Ile Tyr Phe Gly Gly
1 5 10

<210> 24
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 24

Gly Phe Ser Leu Ser Ser Tyr Tyr Met Ser
1 5 10

<210> 25

<211> 19
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 25

Ile Ile Ser Ser Gly Ser Ser Thr Thr Phe Thr Trp Tyr Ala Ser Trp
1 5 10 15

Ala Lys Gly

<210> 26
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 26

Ala Tyr Val Gly Ser Ser Ser Tyr Tyr Gly Phe Asp Pro
1 5 10

<210> 27
<211> 110
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 993

<400> 27

Asp Val Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Ser Ser Tyr
20 25 30

Phe Ser Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Gln Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Thr Leu Ala Ser Gly Val Pro Ser Arg Phe Lys Gly
50 55 60

Ser Gly Ser Gly Thr Glu Leu Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Cys Thr Asp Tyr Ser Gly Ile
85 90 95

Tyr Phe Gly Gly Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 28
<211> 330
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody 933.g1

<400> 28
gatgtcgtga tgactcagtc cccctctaca ttgagtgcct ctgtcggtga tcgagttacc 60

atcacctgtc aagcaagcca gagcatcagc tcctacttct cttggtacca gcaaaagccg 120

ggaaaagccc ctcaactgct gatttatggg gcctcaacac tggcttctgg cgtgccatca 180

agattcaagg gatctggctc cggcactgag cttacactga ccattagctc cctgcaacct 240

gacgattttg ctacctacta ctgccagtgc accgactata gtgggatata tttcggcgga 300

tttgggggag ggacgaaagt ggaaatcaag 330

<210> 29
<211> 121
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 993 (heavy chain)

<400> 29

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Lys Leu Ser Cys Thr Ala Ser Gly Phe Ser Leu Ser Ser Tyr
20 25 30

Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Ile Ile Ser Ser Gly Ser Ser Thr Thr Phe Thr Trp Tyr Ala Ser
50 55 60

Trp Ala Lys Gly Arg Phe Thr Ile Ser Lys Thr Ser Thr Thr Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Thr Tyr Phe Cys
85 90 95

Ala Arg Ala Tyr Val Gly Ser Ser Ser Tyr Tyr Gly Phe Asp Pro Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser
115 120

<210> 30
<211> 363
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody 993.g1

<400> 30
gaagttcagc tggtcgagag cggaggcgga ctggtgcaac ctggtggtag cctgaaactc 60

tcttgtactg cctccgggtt ttccctgagc tcttactata tgtcatgggt gagacaggct 120

cccgggaaag gattggaatg gatcgggatt atctcctccg gctcttccac cactttcaca 180

tggtacgcct catgggcaaa ggggaggttt accataagca agacaagcac gaccgtgtat 240

cttcagatga actccctgaa gacggaggat actgccacct acttttgcgc tcgggcctat 300

gtgggctcaa gctcttacta tggcttcgac ccatggggac agggcacact tgtgaccgtc 360

tcg 363

<210> 31
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 31

Gln Ala Ser Gln Ser Ile Asn Asn Tyr Phe Ser
1 5 10

<210> 32
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 32

Gly Ala Ala Asn Leu Ala Ser
1 5

<210> 33
<211> 12

<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 33

Gln Asn Asn Tyr Gly Val His Ile Tyr Gly Ala Ala
1 5 10

<210> 34
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 34

Gly Phe Ser Leu Ser Asn Tyr Asp Met Ile
1 5 10

<210> 35
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 35

Phe Ile Asn Thr Gly Gly Ile Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 36
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 36

Val Asp Asp Tyr Ile Gly Ala Trp Gly Ala Gly Leu
1 5 10

<210> 37
<211> 110
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 995

<400> 37

Asp Val Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Asn Asn Tyr
20 25 30

Phe Ser Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Gly Ala Ala Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Lys Gly
50 55 60

Ser Gly Ser Gly Thr Glu Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Ser Cys Gln Asn Asn Tyr Gly Val His Ile
85 90 95

Tyr Gly Ala Ala Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 38
<211> 330
<212> DNA
<213> Artificial

<220>
<223> Poly nucleotide encoding antibody variable region for anti-TcdA antibody 995. g1

<400> 38
gacgtcgtga tgacacagag cccttcaaca ctgtctgcaa gcgtgggcga tagggtcacc 60

ataacgtgcc aggcctctca atccatcaac aactatttta gctggtacca gcagaagcca 120

ggcaaggctc cgaaacttct gatctacgga gctgccaacc tggcaagtgg cgtgccatca 180

cggttcaagg gatccgggag cggtactgag tataccctga ccatttcatc tctccaaccc 240

gacgatttcg ccacctactc ctgccagaat aattacggcg tgcacatcta tggagctgcc 300

tttggcggtg ggacaaaagt ggaaattaag 330

<210> 39
<211> 117
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 995 (heavy chain)

<400> 39

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 Thr Ala Ser Gly Phe Ser Leu Ser Asn Tyr
20 25 30

Asp Met Ile Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Ile
35 40 45

Gly Phe Ile Asn Thr Gly Gly Ile Thr Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Ser Ser Thr Val Tyr Leu Gln Met
65 70 75 80

Asn Ser Leu Arg Ala Glu Asp Thr Ala Thr Tyr Phe Cys Ala Arg Val
85 90 95

Asp Asp Tyr Ile Gly Ala Trp Gly Ala Gly Leu Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser
115

<210> 40
<211> 351
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody

<400> 40
gaagttcagc tggtcgagag tgggggaggg cttgtgcaac ctggtggctc cctccgtctg 60

agctgtactg cttctggatt ctcactgagc aattacgaca tgatctgggt gcgacaggca 120

cccggcaaag gactggagta cattggcttc atcaacaccg ggggtataac gtactatgcc 180

tcatgggcta aggggcgctt tacaattagt agggattcct ctaccgtgta cctgcagatg 240

aactcactga gagccgagga cactgccaca tatttctgcg ctcgggtgga tgactatatc 300

ggggcctggg gcgccggatt gtggggccaa ggaacactgg tcaccgtctc g 351

<210> 41
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 41

Gln Ala Ser Gln Ser Ile Ser Ser Tyr Leu Ser
1 5 10

<210> 42
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 42

Arg Ala Ser Thr Leu Ala Ser
1 5

<210> 43
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 43

Leu Gly Val Tyr Gly Tyr Ser Asn Asp Asp Gly Ile Ala
1 5 10

<210> 44
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 44

Gly Ile Asp Leu Ser Ser His His Met Cys
1 5 10

<210> 45
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 45

Val Ile Tyr His Phe Gly Ser Thr Tyr Tyr Ala Asn Trp Ala Thr Gly
1 5 10 15

<210> 46
<211> 11

<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 46

Ala Ser Ile Ala Gly Tyr Ser Ala Phe Asp Pro
1 5 10

<210> 47
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 997

<400> 47

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

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Ser Ser Tyr
20 25 30

Leu Ser Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Arg Ala Ser Thr Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Tyr Thr Leu Thr Ile Ser Cys Leu Gln Ser
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gly Val Tyr Gly Tyr Ser Asn
85 90 95

Asp Asp Gly Ile Ala Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 48
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdA antibody 997.g1

<400> 48
gcactcgtga tgacacagag cccgagtagc tttagtgctt caaccggtga tagggtcact 60

attacttgcc aagcctctca gagtatatct agctatctga gctggtacca gcaaaagccc 120

gggaaggctc ctaaactgct gatctaccgg gcttccacat tggcctccgg cgttccctca 180

cgctttagcg gctccggatc cggaaccgag tacaccctga ctatctcttg cctgcaatct 240

gaggacttcg caacctacta ttgtctgggc gtctacggat atagcaacga tgacgggatc 300

gccttcggcg gcggtaccaa agtggaaatt aag 333

<210> 49
<211> 116
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 997 (heavy chain)

<400> 49

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 Thr Val Ser Gly Ile Asp Leu Ser Ser His
20 25 30

His Met Cys Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Ile
35 40 45

Gly Val Ile Tyr His Phe Gly Ser Thr Tyr Tyr Ala Asn Trp Ala Thr
50 55 60

Gly Arg Phe Thr Ile Ser Lys Asp Ser Thr Thr Val Tyr Leu Gln Met
65 70 75 80

Asn Ser Leu Arg Ala Glu Asp Thr Ala Thr Tyr Phe Cys Ala Arg Ala
85 90 95

Ser Ile Ala Gly Tyr Ser Ala Phe Asp Pro Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser
115

<210> 50
<211> 348
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdA anitbody 997.g1 (heavy chain)

<400> 50
gaggtgcaac ttgtggaaag cgggggagga ctggtgcagc ctgggggctc attgagactg 60

agctgcaccg tttctggtat tgacctgagc tcccatcata tgtgctgggt gcgccaggca 120

cccggaaaag gactggaata catcggcgtc atataccact ttggctctac atactatgcc 180

aactgggcaa ctgggcgatt cacaattagc aaggactcaa ctaccgttta cctgcaaatg 240

aatagcctga gggctgagga tactgccacc tatttctgtg cccgggcttc aatcgccggc 300

tattctgcct ttgatccatg ggggcaagga acactcgtga ccgtctcg 348

<210> 51
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 51

Gln Ala Ser Gln Ser Ile Tyr Ser Tyr Leu Ala
1 5 10

<210> 52
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 52

Asp Ala Ser Thr Leu Ala Ser
1 5

<210> 53
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 53

Gln Gly Asn Ala Tyr Thr Ser Asn Ser His Asp Asn Ala
1 5 10

<210> 54
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 54

Gly Ile Asp Leu Ser Ser Asp Ala Val Gly
1 5 10

<210> 55
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 55

Ile Ile Ala Thr Phe Asp Ser Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 56
<211> 19
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 56

Thr Gly Ser Trp Tyr Tyr Ile Ser Gly Trp Gly Ser Tyr Tyr Tyr Gly
1 5 10 15

Met Asp Leu

<210> 57
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 1000

<400> 57

Glu Ile Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Tyr Ser Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Thr Leu Ala Ser Gly Val Pro Ser Arg Phe Lys Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gly Asn Ala Tyr Thr Ser Asn
85 90 95

Ser His Asp Asn Ala Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 58
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody 1000.g1

<400> 58
gaaatcgtga tgacgcagtc accaagcaca ctgagcgctt ctgtgggaga tcgggtcaca 60

ataacctgtc aggcctccca gagcatctac tcttatctgg catggtacca gcagaagcca 120

gggaaagctc ccaagctgct gatttatgac gccagcactt tggcttccgg tgttcctagt 180

aggttcaaag gctccggaag cggtaccgag tttaccctga ccatctcatc tctgcaaccc 240

gatgactttg ccacatacta ttgccagggg aatgcctaca cttccaactc acacgacaac 300

gcattcgggg gaggcaccaa agtcgaaatt aag 333

<210> 59
<211> 125
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdA antibody 1000 (heavy chain)

<400> 59

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ile Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Val Ser Gly Ile Asp Leu Ser Ser Asp
20 25 30

Ala Val Gly Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Ile
35 40 45

Gly Ile Ile Ala Thr Phe Asp Ser Thr Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

Gly Arg Phe Thr Ile Ser Lys Ala Ser Ser Thr Thr Val Tyr Leu Gln

65 70 75 80

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Thr Tyr Phe Cys Ala Arg
85 90 95

Thr Gly Ser Trp Tyr Tyr Ile Ser Gly Trp Gly Ser Tyr Tyr Tyr Gly
100 105 110

Met Asp Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser
115 120 125

<210> 60
<211> 375
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdA antibody 1000.g1 (heavy chain)

<400> 60
gaagttcagc tggtcgagag cggaggggt ttgattcagc ccggtggctc acttagattg 60

agctgcaccg tgtccggaat cgatctgtca tctgatgccg tgggctgggt gcgacaggca 120

cctgggaaag gactggagta tatagggatc atcgccacct tcgactccac atactacgct 180

agctgggcaa aagggcgctt tacgattagc aaggcctcct ctactaccgt gtacctccaa 240

atgaactcac tgagggccga ggacactgcc acttatttct gtgctcggac cggtagctgg 300

tactacatct ctggctgggg ctcctactat tatggcatgg acctgtgggg acaggggaca 360

ctcgtgaccg tctcg 375

<210> 61
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 61

Arg Ala Ser Lys Ser Val Ser Thr Leu Met His
1 5 10

<210> 62
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 62

Leu Ala Ser Asn Leu Glu Ser
1 5

<210> 63
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 63

Gln Gln Thr Trp Asn Asp Pro Trp Thr
1 5

<210> 64
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 64

Gly Phe Thr Phe Ser Asn Tyr Gly Met Ala
1 5 10

<210> 65
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 65

Ser Ile Ser Ser Ser Gly Gly Ser Thr Tyr Tyr Arg Asp Ser Val Lys
1 5 10 15

Gly

<210> 66
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 66

Val Ile Arg Gly Tyr Val Met Asp Ala
1 5

<210> 67
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 926

<400> 67

Asp Thr Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Lys Ser Val Ser Thr Leu
20 25 30

Met His Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Thr Trp Asn Asp Pro Trp
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 68
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 926.g1

<400> 68
gataccgtgc tgacccagag ccctgctaca ttgtcactga gccccgggga gagggccaca 60

ttgagctgcc gggcttcaaa atccgtgtcc accctcatgc actggtttca gcaaaagccc 120

gggcaggccc caaaactgct gatctacctc gcatctaacc ttgaatctgg cgtgccggcc 180

cgctttagtg gctccggaag cggaaccgac ttcacactga cgattagctc cctggagcct 240

gaggatttcg ccgtgtacta ttgccagcaa acttggaatg acccttggac tttcgggggc 300

ggtactaagg tcgaaataaa g 321

<210> 69
<211> 117
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 926 (heavy chain)

<400> 69

Glu Val Glu Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Glu Ala Ser Gly Phe Thr Phe Ser Asn Tyr
20 25 30

Gly Met Ala Trp Val Arg Gln Ala Pro Thr Lys Gly Leu Glu Trp Val
35 40 45

Thr Ser Ile Ser Ser Ser Gly Gly Ser Thr Tyr Tyr Arg Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Thr Tyr Tyr Cys
85 90 95

Thr Thr Val Ile Arg Gly Tyr Val Met Asp Ala Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser
115

<210> 70
<211> 351
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdBantibody 926.g1 (heavy chain)

<400> 70
gaggtggaac tgctcgaatc tggtggtggg ctggtgcagc ccggtggatc tctgagattg 60

tcatgcgagg catccggctt tacctttcc aactacggaa tggcctgggt gagacaggcc 120

ccaacgaagg ggctcgaatg ggttacaagc atcagctctt ctgggggatc tacttactat 180

cgcgatagcg tcaaaggccg gtttaccatt agccgagata atgccaaatc aagcctgtat 240

ctgcaaatga acagcctgag ggctgaggac accgccacat actattgtac aaccgtgata 300

aggggctacg tgatggacgc atggggacag gggacattgg ttaccgtctc g 351

<210> 71
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 71

Arg Ala Ser Gly Ser Val Ser Thr Leu Met His
1 5 10

<210> 72
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 72

Lys Ala Ser Asn Leu Ala Ser
1 5

<210> 73
<211> 8
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 73

His Gln Ser Trp Asn Ser Asp Thr
1 5

<210> 74
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 74

Gly Phe Thr Phe Ser Asn Tyr Gly Met Ala
1 5 10

<210> 75
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 75

Thr Ile Asn Tyr Asp Gly Arg Thr Thr His Tyr Arg Asp Ser Val Lys
1 5 10 15

Gly

<210> 76
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 76

Ile Ser Arg Ser His Tyr Phe Asp Cys
1 5

<210> 77
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 927

<400> 77

Asp Thr Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gly Ser Val Ser Thr Leu
20 25 30

Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys His Gln Ser Trp Asn Ser Asp Thr
85 90 95

Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
100 105

<210> 78
<211> 318
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antbody variable region for anti-TcdB antibody 927.g2

<400> 78
gacacacaga tgacccagag cccatccact ttgtctgcat ccgtgggcga ccgagtgaca 60

atcacctgta gagcaagcgg ttccgtgagc acactgatgc attggtacca gcagaagcct 120

gggaaggctc ccaagctgct gatctacaaa gccagcaacc ttgcctccgg cgttccaagc 180

cggtttagcg gttccggatc tggaaccgag ttcaccctga ccatatcaag cctgcaaccc 240

gacgacttcg ccacctacta ttgccaccag agctggaata gcgacacgtt cgggcaaggc 300

acaaggctgg aaatcaaa 318

<210> 79
<211> 117
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 927 (heavy chain)

<400> 79

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
20 25 30

Gly Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Thr Ile Asn Tyr Asp Gly Arg Thr Thr His Tyr Arg Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Ser Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Ser Ile Ser Arg Ser His Tyr Phe Asp Cys Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser
115

<210> 80
<211> 351
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 927.g2 (heavy chain)

<400> 80
gaggtgcaac ttgtggaaag cggaggggc gtggtccaac ccggaagaag tctccgtctt 60

tcttgcgccg caagtggctt caccttttcc aactacggaa tggcctgggt tcgacaagct 120

cctgggaaag gattggagtg ggtggccact atcaactatg acggacgcac gacacactac 180

cgagactctg ttaaggggcg ctttacgatt tcccgcgaca atagcaagag caccctctac 240

ctgcaaatga atagcctccg ggccgaggat actgctgtgt actattgtac ctccatctca 300

cggagccact acttcgattg ctggggacaa ggcacactcg tgactgtctc g 351

<210> 81
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 81

Lys Ala Ser Lys Ser Ile Ser Asn His Leu Ala
1 5 10

<210> 82
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 82

Ser Gly Ser Thr Leu Gln Ser
1 5

<210> 83
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 83

Gln Gln Tyr Asp Glu Tyr Pro Tyr Thr
1 5

<210> 84
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 84

Gly Phe Ser Leu Gln Ser Tyr Thr Ile Ser
1 5 10

<210> 85
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 85

Ala Ile Ser Gly Gly Gly Ser Thr Tyr Tyr Asn Leu Pro Leu Lys Ser
1 5 10 15

<210> 86
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 86

Pro Arg Trp Tyr Pro Arg Ser Tyr Phe Asp Tyr
1 5 10

<210> 87
<211> 109
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1099

<400> 87

Asp Val Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Lys Ser Ile Ser Asn His

20 25 30

Leu Ala Trp Tyr Gln Glu Lys Pro Gly Lys Ala Asn Lys Leu Leu Ile
35 40 45

His Ser Gly Ser Thr Leu Gln Ser Gly Thr Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Glu Tyr Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr
100 105

<210> 88
<211> 327
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1099.g2

<400> 88
gacgtccagc tcactcaatc tccctccttt ctgtctgctt ctgtgggcga tcgcgtgaca 60

ataacctgca aggcctccaa atcaattagc aaccatctgg catggtatca ggagaagcct 120

ggcaaagcca ataagctgct gatccactcc ggctcaactc tgcaatccgg taccccaagc 180

cgatttagcg gatctgggag cggaaccgag ttcacactta ccattagctc cctgcaaccg 240

gaggacttcg ccacctatta ctgccagcaa tacgacgaat acccctatac gttcggccaa 300

gggacaagat tggaaatcaa gcgtacg 327

<210> 89
<211> 118
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1099 (heavy chain)

<400> 89

Glu Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Gln Ser Tyr
20 25 30

```
Thr Ile Ser Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Ala Ala Ile Ser Gly Gly Gly Ser Thr Tyr Tyr Asn Leu Pro Leu Lys
    50                  55                  60

Ser Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Ser Gln Val Ser Leu
65                  70                  75                  80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Thr
                85                  90                  95

Arg Pro Arg Trp Tyr Pro Arg Ser Tyr Phe Asp Tyr Trp Gly Arg Gly
            100                 105                 110

Thr Leu Val Thr Val Ser
        115
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<210> 90
<211> 354
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1099.g2 (heavh chain)

<400> 90

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gaagttcagc tgcaggaatc tggacctggc ttggtgaaac caagcgagac acttagtctc       60

acttgcaccg tttccggctt ctcccttcaa tcctacacga tctcttgggt gcggcaacca      120

cccgggaaag gactggaatg gatcgcagcc attagcgggg gagggagcac ctattacaac      180

ttgcctctca agagccgcgt gaccatatcc cgtgacacaa gcaagagcca ggtttccctg      240

aagctgagct ccgtgactgc tgccgatacg gctgtttact attgcacccg acctcgctgg      300

tatccccgtt cctatttcga ctactgggga agaggcacac tggttaccgt ctcg            354
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<210> 91
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 91

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Arg Ala Ser Gln Arg Ile Ser Thr Ser Ile His
1               5                   10
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<210> 92
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 92

Tyr Ala Ser Gln Ser Ile Ser
1 5

<210> 93
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 93

Gln Gln Ser Tyr Ser Ser Leu Tyr Thr
1 5

<210> 94
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDRs

<400> 94

Gly Phe Thr Phe Ser Asp Ser Tyr Met Ala
1 5 10

<210> 95
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 95

Ser Ile Ser Tyr Gly Gly Thr Ile Ile Gln Tyr Gly Asp Ser Val Lys
1 5 10 15

Gly

<210> 96
<211> 11
<212> PRT

<213> Artificial

<220>
<223> Antibody CDR

<400> 96

Arg Gln Gly Thr Tyr Ala Arg Tyr Leu Asp Phe
1 5 10

<210> 97
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1102

<400> 97

Asn Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Ile Ser Thr Ser
20 25 30

Ile His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Ser Tyr Ser Ser Leu Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 98
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1102.g4

<400> 98
aacatcgtgc tgacacagtc tcctgcaacc ctttcactgt ctccaggtga acgagcaacc 60

ctgagttgta gagccagtca gaggatctcc acgagcattc actggtatca gcaaaagcct 120

gggcaagctc ccagactctt gatcaagtac gcctctcaga gcataagtgg cattccagct 180

aggtttagcg gctcaggctc aggaacagac ttcactctga ccatcagctc cctggaaccg 240

gaggactttg ccgtctatta ctgccagcaa tcctactcca gtctgtacac cttcgggcag 300

ggtactaaac tggagataaa g 321

<210> 99
<211> 119
<212> PRT
<213> Artificial

<220>
<223> Antibody variabl region for anti-TcdB antibody 1102 (heavy chain)

<400> 99

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 Val Ser Gly Phe Thr Phe Ser Asp Ser
20 25 30

Tyr Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Ala Ser Ile Ser Tyr Gly Gly Thr Ile Ile Gln Tyr Gly Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Arg Gln Gly Thr Tyr Ala Arg Tyr Leu Asp Phe Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser
115

<210> 100
<211> 357
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1002.g4 (heavy chain)

<400> 100
gaagtgcagc tggtcgaatc cgggggaggt ttggtgcaac caggtggctc actgagactg 60

agctgtgccg tttccggctt tacgttctca gacagttata tggcctgggt gcgtcaagca 120

cctggaaaag ggctggagtg gattgccagt atcagctatg gtgggaccat aatccagtac 180

ggcgatagcg tcaagggcag gtttactatc tccagggaca acgccaagtc aagcctttac 240

ctgcagatga attctctccg cgcagaggat accgctgtgt attactgcgc tagacggcag 300

ggaacctacg ctcgatacct ggacttctgg ggtcagggaa cactcgttac agtctcg 357

<210> 101
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 101

Arg Ala Ser Glu Ser Val Ser Thr Leu Leu His
1 5 10

<210> 102
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 102

Lys Ala Ser Asn Leu Ala Ser
1 5

<210> 103
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 103

His Gln Ser Trp Asn Ser Pro Pro Thr
1 5

<210> 104
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Anitbody CDR

<400> 104

Gly Phe Thr Phe Ser Asn Tyr Gly Met Ala
1 5 10

<210> 105
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 105

Ile Ile Asn Tyr Asp Ala Ser Thr Thr His Tyr Arg Asp Ser Val Lys
1 5 10 15

Gly

<210> 106
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 106

Tyr Gly Arg Ser His Tyr Phe Asp Tyr
1 5

<210> 107
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB anitbody 1114

<400> 107

Ala Thr Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Glu Ser Val Ser Thr Leu
20 25 30

Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro

65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys His Gln Ser Trp Asn Ser Pro Pro
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 108
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1114.g2

<400> 108
gcgacgcaaa tgactcagtc gccctcatcg cttagcgcgt ccgtcggaga tagagtgacg 60

atcacctgcc gcgcatcaga gtcggtgtcc acactcctcc actggtatca gcagaaaccg 120

gggaaggcac caaaactctt gatctacaaa gccagcaacc ttgcgtccgg tgtcccgtca 180

aggttctccg ggagcggttc ggggacagac tttactttga ccatttcgtc gcttcagccg 240

gaggacttcg ccacctatta ctgtcatcag tcatggaact cacctcccac atttggccag 300

ggaacgaaac tcgaaatcaa g 321

<210> 109
<211> 117
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1114 (heavy chain)

<400> 109

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 Phe Thr Phe Ser Asn Tyr
20 25 30

Gly Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Ile Ile Asn Tyr Asp Ala Ser Thr Thr His Tyr Arg Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Tyr Gly Arg Ser His Tyr Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser
115

<210> 110
<211> 351
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding anitbody variable region for anti-TcdB antibody 1114.g2 (heavy chain)

<400> 110
gaagtacaac tcgtagagtc agggggtggg ctggtccaac ctggcggctc ccttcggctt 60

tcgtgtgccg cctcgggatt cacgtttagc aattacggta tggcctgggt gaggcaggca 120

ccagggaagg gtcttgagtg ggtagcgatc atcaactatg atgcaagcac cacccactac 180

agggatagcg tcaagggacg ctttactatc agccgggata atgcgaaatc ctcgctctat 240

ctgcagatga actccctcag agccgaggac accgcagtgt actattgcac acgatacgga 300

cgctcgcact atttcgacta ttggggacag gggacgctcg taactgtctc g 351

<210> 111
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 111

Arg Ala Ser Glu Ser Val Ser Thr Leu Leu His
1 5 10

<210> 112
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Anitbody CDR

<400> 112

Lys Ala Ser Asn Leu Ala Ser
1 5

<210> 113
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 113

His Gln Ser Trp Asn Ser Pro Pro Thr
1 5

<210> 114
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 114

Gly Phe Thr Phe Ser Asn Tyr Gly Met Ala
1 5 10

<210> 115
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 115

Ile Ile Asn Tyr Asp Ala Ser Thr Thr His Tyr Arg Asp Ser Val Lys
1 5 10 15

<210> 116
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 116

Tyr Gly Arg Ser His Tyr Phe Asp Tyr
1 5

<210> 117
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1114 graft 8

<400> 117

Asp Thr Val Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Glu Ser Val Ser Thr Leu
20 25 30

Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys His Gln Ser Trp Asn Ser Pro Pro
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 118
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1114.g8

<400> 118
gacacggtcc tgactcagtc gccctcatcg cttagcgcgt ccgtcggaga tagagtgacg 60

atcacctgcc gcgcatcaga gtcggtgtcc acactcctcc actggtatca gcagaaaccg 120

gggaaggcac caaaactctt gatctacaaa gccagcaacc ttgcgtccgg tgtcccgtca 180

aggttctccg ggagcggttc ggggacagac tttactttga ccatttcgtc gcttcagccg 240

gaggacttcg ccacctatta ctgtcatcag tcatggaact cacctcccac atttggccag 300

ggaacgaaac tcgaaatcaa g 321

<210> 119
<211> 117
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1114 graft 8

(heavy chain)

<400> 119

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 Phe Thr Phe Ser Asn Tyr
20 25 30

Gly Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Ile Ile Asn Tyr Asp Ala Ser Thr Thr His Tyr Arg Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Tyr Gly Arg Ser His Tyr Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser
115

<210> 120
<211> 351
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1114.g8

<400> 120
gaagtacaac tcgtagagtc aggggtgggg ctggtccaac ctggcggctc ccttcggctt 60

tcgtgtgccg cctcgggatt cacgtttagc aattacggta tggcctgggt gaggcaggca 120

ccagggaagg gtcttgagtg ggtagcgatc atcaactatg atgcaagcac cacccactac 180

agggatagcg tcaagggacg ctttactatc agccgggata atgcgaaatc ctcgctctat 240

ctgcagatga actccctcag agccgaggac accgcagtgt actattgcac acgatacgga 300

cgctcgcact atttcgacta ttggggacag gggacgctcg taactgtctc g 351

<210> 121
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 121

Lys Ala Ser Gln Asn Ile Tyr Met Tyr Leu Asn
1 5 10

<210> 122
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 122

Asn Thr Asn Lys Leu His Thr
1 5

<210> 123
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 123

Leu Gln His Lys Ser Phe Pro Tyr Thr
1 5

<210> 124
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 124

Gly Phe Thr Phe Arg Asp Ser Phe Met Ala
1 5 10

<210> 125
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 125

Ser Ile Ser Tyr Glu Gly Asp Lys Thr Tyr Tyr Gly Asp Ser Val Lys

1 5 10 15

Gly

<210> 126
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 126

Leu Thr Ile Thr Thr Ser Gly Asp Ser
1 5

<210> 127
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1125

<400> 127

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asn Ile Tyr Met Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Leu Ile
35 40 45

Tyr Asn Thr Asn Lys Leu His Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln His Lys Ser Phe Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 128
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1125.g2

<400> 128
gatatacaaa tgactcagag ccctagctca ctgagcgctt ctgtgggcga tcgtgtgaca 60

atcacttgca aagcaagcca gaacatctat atgtacctga attggtacca gcaaaaaccg 120

ggaaaagctc ccaagcgcct gatttacaac accaataagc tgcataccgg cgtgccaagc 180

cgttttagcg gatctggctc tggaaccgaa tatacactga ccataagctc cctgcaaccg 240

gaagactttg caacttacta ttgcctccag cacaaatcct tcccctatac gttcggacaa 300

gggaccaaac tggaaatcaa a 321

<210> 129
<211> 118
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1125 (heavy chain)

<400> 129

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 Phe Thr Phe Arg Asp Ser
20 25 30

Phe Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Ser Ile Ser Tyr Glu Gly Asp Lys Thr Tyr Tyr Gly Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Thr Ile Thr Thr Ser Gly Asp Ser Trp Gly Gln Gly Thr
100 105 110

Met Val Thr Val Ser Ser
115

<210> 130

<211> 354
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1125.g2 (heavy chain)

<400> 130
gaagtgcagc tggtcgaaag cggcggagga ttggtgcaac ctggtggctc tcttcgcctg 60

tcttgcgctg caagcggctt tacgttccgc gatagcttta tggcttgggt gcgacaagct 120

cctgggaaag ggctggaatg ggtcgctagc ataagctacg aaggcgacaa gacttactat 180

ggggactctg tgaaaggccg attcaccatt agccgagaca acgcaaagaa ctccctgtac 240

ctgcagatga actccctgcg tgccgaagat accgccgtgt actattgcgc taggctgacg 300

atcactacaa gcggagatag ctggggacaa gggacaatgg tgaccgtctc gagc 354

<210> 131
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 131

Lys Ala Ser Gln His Val Gly Thr Asn Val Asp
1 5 10

<210> 132
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 132

Gly Ala Ser Ile Arg Tyr Thr
1 5

<210> 133
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 133

Leu Gln Tyr Asn Tyr Asn Pro Tyr Thr
1 5

<210> 134
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 134

Gly Phe Ile Phe Ser Asn Phe Gly Met Ser
1 5 10

<210> 135
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 135

Ser Ile Ser Pro Ser Gly Gly Asn Ala Tyr Tyr Arg Asp Ser Val Lys
1 5 10 15

Gly

<210> 136
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 136

Arg Ala Tyr Ser Ser Pro Phe Ala Phe
1 5

<210> 137
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1129

<400> 137

Asp Thr Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln His Val Gly Thr Asn
20 25 30

Val Asp Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Ile Arg Tyr Thr Gly Val Pro Asp Arg Phe Thr Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Val Ala Thr Tyr Tyr Cys Leu Gln Tyr Asn Tyr Asn Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 138
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1129.g1

<400> 138
gacacccaga tgactcagtc tccgtcaagc ctttctgcct ctgttggaga tcgagtcaca 60

attacgtgca aggcaagcca acacgtgggt accaacgtgg actggtatca acagaagcca 120

gggaaggtcc ccaaactgct gatctacggt gccagtattc gctataccgg cgtgcctgat 180

cgcttcaccg gaagcgggtc agggaccgat ttcacactga caatcagctc cctgcaacct 240

gaagacgtgg ctacttacta ctgcctgcag tacaactata atccctacac ctttggccag 300

ggcaccaaac tggagataaa g 321

<210> 139
<211> 118
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1129 (heavy chain)

<400> 139

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Thr Ser Gly Phe Ile Phe Ser Asn Phe
20 25 30

Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Ser Ile Ser Pro Ser Gly Gly Asn Ala Tyr Tyr Arg Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Thr Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Arg Ala Tyr Ser Ser Pro Phe Ala Phe Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 140
<211> 354
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1129.g1(heavy chain)

<400> 140
gaggtgcaac ttgtggaatc aggaggtggc gtggttcagc ccggtagatc acttcgtctg 60

agttgtgcaa caagcggctt tatcttctcc aacttcggga tgtcttgggt tagacaggct 120

cctggtaagg gcctcgaatg ggtggctagt attagcccaa gcgggggaaa cgcctactat 180

agggacagcg tgaaaggacg cttcactatc agccgagata actccaagac cacgctgtat 240

ctgcagatga atagtctgag ggccgaggat accgcagtgt actactgcac tcgacgggcc 300

tattcttccc cttttgcctt ttggggacag gggactctgg tgacagtctc gagc 354

<210> 141
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 141

Lys Ala Ser Lys Ser Ile Ser Asn His Leu Ala
1 5 10

<210> 142

<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 142

Ser Gly Ser Thr Leu Gln Pro
1 5

<210> 143
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 143

Gln Gln Tyr Asp Glu Tyr Pro Tyr Thr
1 5

<210> 144
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 144

Gly Phe Ser Leu Asn Ser Tyr Thr Ile Thr
1 5 10

<210> 145
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 145

Ala Ile Ser Gly Gly Gly Ser Thr Tyr Phe Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 146
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 146

Pro Arg Trp Tyr Pro Arg Ser Tyr Phe Asp Tyr
1 5 10

<210> 147
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1134

<400> 147

Asp Val Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Lys Ser Ile Ser Asn His
20 25 30

Leu Ala Trp Tyr Gln Glu Lys Pro Gly Lys Ala Asn Lys Leu Leu Ile
35 40 45

His Ser Gly Ser Thr Leu Gln Pro Gly Thr Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Glu Tyr Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
100 105

<210> 148
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1134.g5

<400> 148
gacgtccagc tcactcaatc tccctccttt ctgtctgctt ctgtgggcga tcgcgtgaca 60

ataacctgca aggcctccaa atcaattagc aaccatctgg catggtatca ggagaagcct 120

ggcaaagcca ataagctgct gatccactcc ggctcaactc tgcaacccgg taccccaagc 180

cgatttagcg gatctgggag cggaaccgag ttcacactta ccattagctc cctgcaaccg 240

gaggacttcg ccacctatta ctgccagcaa tacgacgaat acccctatac gttcggccaa 300

gggacaagat tggaaatcaa g 321

<210> 149
<211> 118
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1134 (heavy chain)

<400> 149

Glu Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Asn Ser Tyr
20 25 30

Thr Ile Thr Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Ala Ala Ile Ser Gly Gly Gly Ser Thr Tyr Phe Asn Ser Ala Leu Lys
50 55 60

Ser Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Ser Gln Val Ser Leu
65 70 75 80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Thr
85 90 95

Arg Pro Arg Trp Tyr Pro Arg Ser Tyr Phe Asp Tyr Trp Gly Arg Gly
100 105 110

Thr Leu Val Thr Val Ser
115

<210> 150
<211> 354
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1134.g5 (heavy chain)

<400> 150
gaagttcagc tgcaggaatc tggacctggc ttggtgaaac caagcgagac acttagtctc 60

acttgcaccg tttccggctt ctcccttaat tcctacacga tcacttgggt gcggcaacca 120

cccgggaaag gactggaatg gatcgcagcc attagcgggg gagggagcac ctatttcaac 180

tcggctctca agagccgcgt gaccatatcc cgtgacacaa gcaagagcca ggtttccctg 240

aagctgagct ccgtgactgc tgccgatacg gctgtttact attgcacccg acctcgctgg 300

tatccccgtt cctatttcga ctactgggga agaggcacac tggttaccgt ctcg 354

<210> 151
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 151

Lys Ala Ser Gln Asn Val Gly Asn Asn Val Ala
1 5 10

<210> 152
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 152

Tyr Ala Ser Asn Arg Phe Thr
1 5

<210> 153
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 153

Gln Arg Val Tyr Gln Ser Thr Trp Thr
1 5

<210> 154
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 154

Gly Phe Ser Leu Thr Ser Tyr Tyr Val His
1 5 10

<210> 155
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 155

Cys Ile Arg Thr Gly Gly Asn Thr Glu Tyr Gln Ser Glu Phe Lys Ser
1 5 10 15

<210> 156
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 156

Gly Asn Tyr Gly Phe Ala Tyr
1 5

<210> 157
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1151

<400> 157

Ala Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asn Val Gly Asn Asn
20 25 30

Val Ala Trp Tyr Gln His Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Ala Ser Asn Arg Phe Thr Gly Val Pro Ser Arg Phe Thr Gly
50 55 60

Gly Gly Tyr Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Arg Val Tyr Gln Ser Thr Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys

100 105

<210> 158
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide encoding antibody variable region for anti-TcdB antibody 1151.g1

<400> 158
gcgattcaaa tgactcagtc gccctcatcg cttagcgcgt ccgtcggaga tagagtgacg 60

atcacgtgca aagcatcaca aaatgtcggg aacaatgtgg catggtatca gcataaaccg 120

gggaaggcac caaaactctt gatctactac gccagcaaca ggtttactgg tgtcccgtca 180

aggttcacgg gaggggggtta cgggacagac tttactttga ccatttcgtc gcttcagccg 240

gaggacttcg ccacctatta ctgtcagagg gtctaccagt caacgtggac atttggccag 300

ggaacgaaag tggaaatcaa g 321

<210> 159
<211> 114
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1151 (heavy chain)

<400> 159

Glu Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Thr Ser Tyr
20 25 30

Tyr Val His Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Cys Ile Arg Thr Gly Gly Asn Thr Glu Tyr Gln Ser Glu Phe Lys
50 55 60

Ser Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln Val Ser Leu
65 70 75 80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Gly Asn Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser

<210> 160
<211> 342
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1151.g4 (heavy chain)

<400> 160
gaagtacaac tccaagagtc ggggcctggt ctggtcaagc cgtccgaaac actttcgctg 60

acgtgtacgg tatcaggatt ctcacttaca tcatactacg tccactgggt gaggcagcca 120

cccgggaagg gtcttgagtg gatgggctgc attagaaccg gagggaatac cgagtaccag 180

agcgaattta agagccgcgt cactatcagc cgggatacgt ccaaaaacca ggtgtcgctc 240

aaattgtcct ccgtgacggc cgctgacacc gcagtgtact attgcgcgcg aggaaactat 300

ggctttgcgt attggggaca ggggacgctc gtaactgtct cg 342

<210> 161
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 161

Lys Ala Ser Gln Asn Ile Asn Lys Tyr Leu Asp
1 5 10

<210> 162
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 162

Asn Ile Gln Ser Leu His Thr
1 5

<210> 163
<211> 7
<212> PRT
<213> Artificial

<220>

<223> Antibody CDR

<400> 163

Phe Gln His Asn Ser Gly Trp
1   5

<210> 164
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 164

Gly Phe Thr Phe Thr Gln Ala Ala Met Phe
1   5   10

<210> 165
<211> 19
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 165

Arg Ile Ser Thr Lys Ser Asn Asn Phe Ala Thr Tyr Tyr Pro Asp Ser
1   5   10   15

Val Lys Gly

<210> 166
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Antibody CDR

<400> 166

Pro Ala Tyr Tyr Tyr Asp Gly Thr Val Pro Phe Ala Tyr
1   5   10

<210> 167
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1153.g8

<400> 167

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asn Ile Asn Lys Tyr
            20                  25                  30

Leu Asp Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Asn Ile Gln Ser Leu His Thr Gly Ile Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Val Ala Thr Tyr Tyr Cys Phe Gln His Asn Ser Gly Trp Thr
                85                  90                  95

Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
            100                 105
```

<210> 168
<211> 318
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1153.g8

<400> 168
gatatacaga tgactcagtc cccttctagc ctttcagctt ccgtgggcga tagagtgact 60

atcacgtgta aggctagtca gaacattaac aagtatctgg actggtacca gcagaaaccc 120

gggaaggttc ccaagctgct gatctacaac atccagtccc tgcatacagg cattcctagc 180

cggtttagcg gatctggttc agggaccgac ttcaccctga caatcagctc tctgcaacca 240

gaagacgtgg ccacctatta ctgcttccag cacaatagtg gctggacttt tggacaaggt 300

accaggctgg agatcaaa 318

<210> 169
<211> 123
<212> PRT
<213> Artificial

<220>
<223> Antibody variable region for anti-TcdB antibody 1153 (graft 8 heavy chain)

<400> 169

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Gln Ala
20 25 30

Ala Met Phe Trp Val Arg Gln Ala Ser Gly Lys Gly Leu Glu Gly Ile
35 40 45

Ala Arg Ile Ser Thr Lys Ser Asn Asn Phe Ala Thr Tyr Tyr Pro Asp
50 55 60

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65 70 75 80

Val Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
85 90 95

Tyr Cys Thr Ala Pro Ala Tyr Tyr Tyr Asp Gly Thr Val Pro Phe Ala
100 105 110

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
115 120

<210> 170
<211> 369
<212> DNA
<213> Artificial

<220>
<223> Polynucleotide sequence encoding antibody variable region for anti-TcdB antibody 1153.g8 (heavy chain)

<400> 170
gaggttcagc tggtggaatc aggaggggt ctggtgcaac caggaggctc cctgaaactg 60

tcttgcgccg caagcggctt tacgtttacc caggccgcta tgttctgggt taggcaggcc 120

agtgggaagg gtcttgaagg catcgcaaga atcagcacca agagcaacaa tttcgctacg 180

tactatccgg actccgtgaa aggccggttt accatttctc gcgatgacag caagaacacc 240

gtgtacctgc agatgaacag tctcaagacc gaggacacag ccgtgtacta ttgtactgct 300

cccgcctatt attacgatgg cacagtgcct ttcgcatact ggggacaggg tactttggtg 360

actgtctcg 369

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Met Ser Leu Ile Ser Lys Glu Glu Leu Ile Lys Leu Ala Tyr Ser Ile
1               5                  10                  15

Arg Pro Arg Glu Asn Glu Tyr Lys Thr Ile Leu Thr Asn Leu Asp Glu
            20                  25                  30

Tyr Asn Lys Leu Thr Thr Asn Asn Asn Glu Asn Lys Tyr Leu Gln Leu
        35                  40                  45

Lys Lys Leu Asn Glu Ser Ile Asp Val Phe Met Asn Lys Tyr Lys Thr
    50                  55                  60

Ser Ser Arg Asn Arg Ala Leu Ser Asn Leu Lys Lys Asp Ile Leu Lys
65                  70                  75                  80

Glu Val Ile Leu Ile Lys Asn Ser Asn Thr Ser Pro Val Glu Lys Asn
                85                  90                  95

Leu His Phe Val Trp Ile Gly Gly Glu Val Ser Asp Ile Ala Leu Glu
            100                 105                 110

Tyr Ile Lys Gln Trp Ala Asp Ile Asn Ala Glu Tyr Asn Ile Lys Leu
        115                 120                 125

Trp Tyr Asp Ser Glu Ala Phe Leu Val Asn Thr Leu Lys Lys Ala Ile
    130                 135                 140

Val Glu Ser Ser Thr Thr Glu Ala Leu Gln Leu Leu Glu Glu Glu Ile
145                 150                 155                 160

Gln Asn Pro Gln Phe Asp Asn Met Lys Phe Tyr Lys Lys Arg Met Glu
                165                 170                 175

Phe Ile Tyr Asp Arg Gln Lys Arg Phe Ile Asn Tyr Tyr Lys Ser Gln
            180                 185                 190

Ile Asn Lys Pro Thr Val Pro Thr Ile Asp Asp Ile Ile Lys Ser His
        195                 200                 205

Leu Val Ser Glu Tyr Asn Arg Asp Glu Thr Val Leu Glu Ser Tyr Arg
    210                 215                 220

Thr Asn Ser Leu Arg Lys Ile Asn Ser Asn His Gly Ile Asp Ile Arg
225                 230                 235                 240

Ala Asn Ser Leu Phe Thr Glu Gln Glu Leu Leu Asn Ile Tyr Ser Gln
                245                 250                 255
```

```
Glu Leu Leu Asn Arg Gly Asn Leu Ala Ala Ala Ser Asp Ile Val Arg
            260                 265                 270

Leu Leu Ala Leu Lys Asn Phe Gly Gly Val Tyr Leu Asp Val Asp Met
        275                 280                 285

Leu Pro Gly Ile His Ser Asp Leu Phe Lys Thr Ile Ser Arg Pro Ser
    290                 295                 300

Ser Ile Gly Leu Asp Arg Trp Glu Met Ile Lys Leu Glu Ala Ile Met
305                 310                 315                 320

Lys Tyr Lys Lys Tyr Ile Asn Asn Tyr Thr Ser Glu Asn Phe Asp Lys
                325                 330                 335

Leu Asp Gln Gln Leu Lys Asp Asn Phe Lys Leu Ile Ile Glu Ser Lys
            340                 345                 350

Ser Glu Lys Ser Glu Ile Phe Ser Lys Leu Glu Asn Leu Asn Val Ser
        355                 360                 365

Asp Leu Glu Ile Lys Ile Ala Phe Ala Leu Gly Ser Val Ile Asn Gln
    370                 375                 380

Ala Leu Ile Ser Lys Gln Gly Ser Tyr Leu Thr Asn Leu Val Ile Glu
385                 390                 395                 400

Gln Val Lys Asn Arg Tyr Gln Phe Leu Asn Gln His Leu Asn Pro Ala
                405                 410                 415

Ile Glu Ser Asp Asn Asn Phe Thr Asp Thr Thr Lys Ile Phe His Asp
            420                 425                 430

Ser Leu Phe Asn Ser Ala Thr Ala Glu Asn Ser Met Phe Leu Thr Lys
        435                 440                 445

Ile Ala Pro Tyr Leu Gln Val Gly Phe Met Pro Glu Ala Arg Ser Thr
    450                 455                 460

Ile Ser Leu Ser Gly Pro Gly Ala Tyr Ala Ser Ala Tyr Tyr Asp Phe
465                 470                 475                 480

Ile Asn Leu Gln Glu Asn Thr Ile Glu Lys Thr Leu Lys Ala Ser Asp
                485                 490                 495

Leu Ile Glu Phe Lys Phe Pro Glu Asn Asn Leu Ser Gln Leu Thr Glu
```

```
            500                 505                 510

Gln Glu Ile Asn Ser Leu Trp Ser Phe Asp Gln Ala Ser Ala Lys Tyr
        515                 520                 525

Gln Phe Glu Lys Tyr Val Arg Asp Tyr Thr Gly Gly Ser Leu Ser Glu
    530                 535                 540

Asp Asn Gly Val Asp Phe Asn Lys Asn Thr Ala Leu Asp Lys Asn Tyr
545                 550                 555                 560

Leu Leu Asn Asn Lys Ile Pro Ser Asn Asn Val Glu Glu Ala Gly Ser
                565                 570                 575

Lys Asn Tyr Val His Tyr Ile Ile Gln Leu Gln Gly Asp Asp Ile Ser
            580                 585                 590

Tyr Glu Ala Thr Cys Asn Leu Phe Ser Lys Asn Pro Lys Asn Ser Ile
        595                 600                 605

Ile Ile Gln Arg Asn Met Asn Glu Ser Ala Lys Ser Tyr Phe Leu Ser
    610                 615                 620

Asp Asp Gly Glu Ser Ile Leu Glu Leu Asn Lys Tyr Arg Ile Pro Glu
625                 630                 635                 640

Arg Leu Lys Asn Lys Glu Lys Val Lys Val Thr Phe Ile Gly His Gly
                645                 650                 655

Lys Asp Glu Phe Asn Thr Ser Glu Phe Ala Arg Leu Ser Val Asp Ser
            660                 665                 670

Leu Ser Asn Glu Ile Ser Ser Phe Leu Asp Thr Ile Lys Leu Asp Ile
        675                 680                 685

Ser Pro Lys Asn Val Glu Val Asn Leu Leu Gly Cys Asn Met Phe Ser
    690                 695                 700

Tyr Asp Phe Asn Val Glu Glu Thr Tyr Pro Gly Lys Leu Leu Leu Ser
705                 710                 715                 720

Ile Met Asp Lys Ile Thr Ser Thr Leu Pro Asp Val Asn Lys Asn Ser
                725                 730                 735

Ile Thr Ile Gly Ala Asn Gln Tyr Glu Val Arg Ile Asn Ser Glu Gly
            740                 745                 750
```

```
Arg Lys Glu Leu Leu Ala His Ser Gly Lys Trp Ile Asn Lys Glu Glu
        755                 760                 765

Ala Ile Met Ser Asp Leu Ser Ser Lys Glu Tyr Ile Phe Phe Asp Ser
    770                 775                 780

Ile Asp Asn Lys Leu Lys Ala Lys Ser Lys Asn Ile Pro Gly Leu Ala
785                 790                 795                 800

Ser Ile Ser Glu Asp Ile Lys Thr Leu Leu Leu Asp Ala Ser Val Ser
                805                 810                 815

Pro Asp Thr Lys Phe Ile Leu Asn Asn Leu Lys Leu Asn Ile Glu Ser
            820                 825                 830

Ser Ile Gly Asp Tyr Ile Tyr Tyr Glu Lys Leu Glu Pro Val Lys Asn
        835                 840                 845

Ile Ile His Asn Ser Ile Asp Asp Leu Ile Asp Glu Phe Asn Leu Leu
    850                 855                 860

Glu Asn Val Ser Asp Glu Leu Tyr Glu Leu Lys Lys Leu Asn Asn Leu
865                 870                 875                 880

Asp Glu Lys Tyr Leu Ile Ser Phe Glu Asp Ile Ser Lys Asn Asn Ser
                885                 890                 895

Thr Tyr Ser Val Arg Phe Ile Asn Lys Ser Asn Gly Glu Ser Val Tyr
            900                 905                 910

Val Glu Thr Glu Lys Glu Ile Phe Ser Lys Tyr Ser Glu His Ile Thr
        915                 920                 925

Lys Glu Ile Ser Thr Ile Lys Asn Ser Ile Ile Thr Asp Val Asn Gly
    930                 935                 940

Asn Leu Leu Asp Asn Ile Gln Leu Asp His Thr Ser Gln Val Asn Thr
945                 950                 955                 960

Leu Asn Ala Ala Phe Phe Ile Gln Ser Leu Ile Asp Tyr Ser Ser Asn
                965                 970                 975

Lys Asp Val Leu Asn Asp Leu Ser Thr Ser Val Lys Val Gln Leu Tyr
            980                 985                 990

Ala Gln Leu Phe Ser Thr Gly Leu  Asn Thr Ile Tyr Asp  Ser Ile Gln
        995                 1000                1005
```

```
Leu Val  Asn Leu Ile Ser Asn  Ala Val Asn Asp Thr  Ile Asn Val
    1010                1015                1020

Leu Pro  Thr Ile Thr Glu Gly  Ile Pro Ile Val Ser  Thr Ile Leu
    1025                1030                1035

Asp Gly  Ile Asn Leu Gly Ala  Ala Ile Lys Glu Leu  Leu Asp Glu
    1040                1045                1050

His Asp  Pro Leu Leu Lys Lys  Glu Leu Glu Ala Lys  Val Gly Val
    1055                1060                1065

Leu Ala  Ile Asn Met Ser Leu  Ser Ile Ala Ala Thr  Val Ala Ser
    1070                1075                1080

Ile Val  Gly Ile Gly Ala Glu  Val Thr Ile Phe Leu  Leu Pro Ile
    1085                1090                1095

Ala Gly  Ile Ser Ala Gly Ile  Pro Ser Leu Val Asn  Asn Glu Leu
    1100                1105                1110

Ile Leu  His Asp Lys Ala Thr  Ser Val Val Asn Tyr  Phe Asn His
    1115                1120                1125

Leu Ser  Glu Ser Lys Lys Tyr  Gly Pro Leu Lys Thr  Glu Asp Asp
    1130                1135                1140

Lys Ile  Leu Val Pro Ile Asp  Asp Leu Val Ile Ser  Glu Ile Asp
    1145                1150                1155

Phe Asn  Asn Asn Ser Ile Lys  Leu Gly Thr Cys Asn  Ile Leu Ala
    1160                1165                1170

Met Glu  Gly Gly Ser Gly His  Thr Val Thr Gly Asn  Ile Asp His
    1175                1180                1185

Phe Phe  Ser Ser Pro Ser Ile  Ser Ser His Ile Pro  Ser Leu Ser
    1190                1195                1200

Ile Tyr  Ser Ala Ile Gly Ile  Glu Thr Glu Asn Leu  Asp Phe Ser
    1205                1210                1215

Lys Lys  Ile Met Met Leu Pro  Asn Ala Pro Ser Arg  Val Phe Trp
    1220                1225                1230

Trp Glu  Thr Gly Ala Val Pro  Gly Leu Arg Ser Leu  Glu Asn Asp
    1235                1240                1245
```

```
Gly Thr  Arg Leu Leu Asp Ser  Ile Arg Asp Leu Tyr  Pro Gly Lys
    1250                1255                1260

Phe Tyr  Trp Arg Phe Tyr Ala  Phe Phe Asp Tyr Ala  Ile Thr Thr
    1265                1270                1275

Leu Lys  Pro Val Tyr Glu Asp  Thr Asn Ile Lys Ile  Lys Leu Asp
    1280                1285                1290

Lys Asp  Thr Arg Asn Phe Ile  Met Pro Thr Ile Thr  Thr Asn Glu
    1295                1300                1305

Ile Arg  Asn Lys Leu Ser Tyr  Ser Phe Asp Gly Ala  Gly Gly Thr
    1310                1315                1320

Tyr Ser  Leu Leu Leu Ser Ser  Tyr Pro Ile Ser Thr  Asn Ile Asn
    1325                1330                1335

Leu Ser  Lys Asp Asp Leu Trp  Ile Phe Asn Ile Asp  Asn Glu Val
    1340                1345                1350

Arg Glu  Ile Ser Ile Glu Asn  Gly Thr Ile Lys Lys  Gly Lys Leu
    1355                1360                1365

Ile Lys  Asp Val Leu Ser Lys  Ile Asp Ile Asn Lys  Asn Lys Leu
    1370                1375                1380

Ile Ile  Gly Asn Gln Thr Ile  Asp Phe Ser Gly Asp  Ile Asp Asn
    1385                1390                1395

Lys Asp  Arg Tyr Ile Phe Leu  Thr Cys Glu Leu Asp  Asp Lys Ile
    1400                1405                1410

Ser Leu  Ile Ile Glu Ile Asn  Leu Val Ala Lys Ser  Tyr Ser Leu
    1415                1420                1425

Leu Leu  Ser Gly Asp Lys Asn  Tyr Leu Ile Ser Asn  Leu Ser Asn
    1430                1435                1440

Thr Ile  Glu Lys Ile Asn Thr  Leu Gly Leu Asp Ser  Lys Asn Ile
    1445                1450                1455

Ala Tyr  Asn Tyr Thr Asp Glu  Ser Asn Asn Lys Tyr  Phe Gly Ala
    1460                1465                1470

Ile Ser  Lys Thr Ser Gln Lys  Ser Ile Ile His Tyr  Lys Lys Asp
```

1475 1480 1485

Ser Lys Asn Ile Leu Glu Phe Tyr Asn Asp Ser Thr Leu Glu Phe
1490 1495 1500

Asn Ser Lys Asp Phe Ile Ala Glu Asp Ile Asn Val Phe Met Lys
1505 1510 1515

Asp Asp Ile Asn Thr Ile Thr Gly Lys Tyr Tyr Val Asp Asn Asn
1520 1525 1530

Thr Asp Lys Ser Ile Asp Phe Ser Ile Ser Leu Val Ser Lys Asn
1535 1540 1545

Gln Val Lys Val Asn Gly Leu Tyr Leu Asn Glu Ser Val Tyr Ser
1550 1555 1560

Ser Tyr Leu Asp Phe Val Lys Asn Ser Asp Gly His His Asn Thr
1565 1570 1575

Ser Asn Phe Met Asn Leu Phe Leu Asp Asn Ile Ser Phe Trp Lys
1580 1585 1590

Leu Phe Gly Phe Glu Asn Ile Asn Phe Val Ile Asp Lys Tyr Phe
1595 1600 1605

Thr Leu Val Gly Lys Thr Asn Leu Gly Tyr Val Glu Phe Ile Cys
1610 1615 1620

Asp Asn Asn Lys Asn Ile Asp Ile Tyr Phe Gly Glu Trp Lys Thr
1625 1630 1635

Ser Ser Ser Lys Ser Thr Ile Phe Ser Gly Asn Gly Arg Asn Val
1640 1645 1650

Val Val Glu Pro Ile Tyr Asn Pro Asp Thr Gly Glu Asp Ile Ser
1655 1660 1665

Thr Ser Leu Asp Phe Ser Tyr Glu Pro Leu Tyr Gly Ile Asp Arg
1670 1675 1680

Tyr Ile Asn Lys Val Leu Ile Ala Pro Asp Leu Tyr Thr Ser Leu
1685 1690 1695

Ile Asn Ile Asn Thr Asn Tyr Tyr Ser Asn Glu Tyr Tyr Pro Glu
1700 1705 1710

```
Ile Ile  Val Leu Asn Pro Asn  Thr Phe His Lys Lys  Val Asn Ile
    1715                1720                1725

Asn Leu  Asp Ser Ser Ser Phe  Glu Tyr Lys Trp Ser  Thr Glu Gly
    1730                1735                1740

Ser Asp  Phe Ile Leu Val Arg  Tyr Leu Glu Glu Ser  Asn Lys Lys
    1745                1750                1755

Ile Leu  Gln Lys Ile Arg Ile  Lys Gly Ile Leu Ser  Asn Thr Gln
    1760                1765                1770

Ser Phe  Asn Lys Met Ser Ile  Asp Phe Lys Asp Ile  Lys Lys Leu
    1775                1780                1785

Ser Leu  Gly Tyr Ile Met Ser  Asn Phe Lys Ser Phe  Asn Ser Glu
    1790                1795                1800

Asn Glu  Leu Asp Arg Asp His  Leu Gly Phe Lys Ile  Ile Asp Asn
    1805                1810                1815

Lys Thr  Tyr Tyr Tyr Asp Glu  Asp Ser Lys Leu Val  Lys Gly Leu
    1820                1825                1830

Ile Asn  Ile Asn Asn Ser Leu  Phe Tyr Phe Asp Pro  Ile Glu Phe
    1835                1840                1845

Asn Leu  Val Thr Gly Trp Gln  Thr Ile Asn Gly Lys  Lys Tyr Tyr
    1850                1855                1860

Phe Asp  Ile Asn Thr Gly Ala  Ala Leu Thr Ser Tyr  Lys Ile Ile
    1865                1870                1875

Asn Gly  Lys His Phe Tyr Phe  Asn Asn Asp Gly Val  Met Gln Leu
    1880                1885                1890

Gly Val  Phe Lys Gly Pro Asp  Gly Phe Glu Tyr Phe  Ala Pro Ala
    1895                1900                1905

Asn Thr  Gln Asn Asn Asn Ile  Glu Gly Gln Ala Ile  Val Tyr Gln
    1910                1915                1920

Ser Lys  Phe Leu Thr Leu Asn  Gly Lys Lys Tyr Tyr  Phe Asp Asn
    1925                1930                1935

Asn Ser  Lys Ala Val Thr Gly  Trp Arg Ile Ile Asn  Asn Glu Lys
    1940                1945                1950
```

```
Tyr Tyr  Phe Asn Pro Asn Asn  Ala Ile Ala Ala Val  Gly Leu Gln
    1955                1960                1965

Val Ile  Asp Asn Asn Lys Tyr  Tyr Phe Asn Pro Asp  Thr Ala Ile
    1970                1975                1980

Ile Ser  Lys Gly Trp Gln Thr  Val Asn Gly Ser Arg  Tyr Tyr Phe
    1985                1990                1995

Asp Thr  Asp Thr Ala Ile Ala  Phe Asn Gly Tyr Lys  Thr Ile Asp
    2000                2005                2010

Gly Lys  His Phe Tyr Phe Asp  Ser Asp Cys Val Val  Lys Ile Gly
    2015                2020                2025

Val Phe  Ser Thr Ser Asn Gly  Phe Glu Tyr Phe Ala  Pro Ala Asn
    2030                2035                2040

Thr Tyr  Asn Asn Asn Ile Glu  Gly Gln Ala Ile Val  Tyr Gln Ser
    2045                2050                2055

Lys Phe  Leu Thr Leu Asn Gly  Lys Lys Tyr Tyr Phe  Asp Asn Asn
    2060                2065                2070

Ser Lys  Ala Val Thr Gly Leu  Gln Thr Ile Asp Ser  Lys Lys Tyr
    2075                2080                2085

Tyr Phe  Asn Thr Asn Thr Ala  Glu Ala Ala Thr Gly  Trp Gln Thr
    2090                2095                2100

Ile Asp  Gly Lys Lys Tyr Tyr  Phe Asn Thr Asn Thr  Ala Glu Ala
    2105                2110                2115

Ala Thr  Gly Trp Gln Thr Ile  Asp Gly Lys Lys Tyr  Tyr Phe Asn
    2120                2125                2130

Thr Asn  Thr Ala Ile Ala Ser  Thr Gly Tyr Thr Ile  Ile Asn Gly
    2135                2140                2145

Lys His  Phe Tyr Phe Asn Thr  Asp Gly Ile Met Gln  Ile Gly Val
    2150                2155                2160

Phe Lys  Gly Pro Asn Gly Phe  Glu Tyr Phe Ala Pro  Ala Asn Thr
    2165                2170                2175

Asp Ala  Asn Asn Ile Glu Gly  Gln Ala Ile Leu Tyr  Gln Asn Glu
    2180                2185                2190
```

```
Phe Leu  Thr Leu Asn Gly Lys  Lys Tyr Tyr Phe Gly  Ser Asp Ser
    2195                 2200                 2205

Lys Ala  Val Thr Gly Trp Arg  Ile Ile Asn Asn Lys  Lys Tyr Tyr
    2210                 2215                 2220

Phe Asn  Pro Asn Asn Ala Ile  Ala Ala Ile His Leu  Cys Thr Ile
    2225                 2230                 2235

Asn Asn  Asp Lys Tyr Tyr Phe  Ser Tyr Asp Gly Ile  Leu Gln Asn
    2240                 2245                 2250

Gly Tyr  Ile Thr Ile Glu Arg  Asn Asn Phe Tyr Phe  Asp Ala Asn
    2255                 2260                 2265

Asn Glu  Ser Lys Met Val Thr  Gly Val Phe Lys Gly  Pro Asn Gly
    2270                 2275                 2280

Phe Glu  Tyr Phe Ala Pro Ala  Asn Thr His Asn Asn  Asn Ile Glu
    2285                 2290                 2295

Gly Gln  Ala Ile Val Tyr Gln  Asn Lys Phe Leu Thr  Leu Asn Gly
    2300                 2305                 2310

Lys Lys  Tyr Tyr Phe Asp Asn  Asp Ser Lys Ala Val  Thr Gly Trp
    2315                 2320                 2325

Gln Thr  Ile Asp Gly Lys Lys  Tyr Tyr Phe Asn Leu  Asn Thr Ala
    2330                 2335                 2340

Glu Ala  Ala Thr Gly Trp Gln  Thr Ile Asp Gly Lys  Lys Tyr Tyr
    2345                 2350                 2355

Phe Asn  Leu Asn Thr Ala Glu  Ala Ala Thr Gly Trp  Gln Thr Ile
    2360                 2365                 2370

Asp Gly  Lys Lys Tyr Tyr Phe  Asn Thr Asn Thr Phe  Ile Ala Ser
    2375                 2380                 2385

Thr Gly  Tyr Thr Ser Ile Asn  Gly Lys His Phe Tyr  Phe Asn Thr
    2390                 2395                 2400

Asp Gly  Ile Met Gln Ile Gly  Val Phe Lys Gly Pro  Asn Gly Phe
    2405                 2410                 2415

Glu Tyr  Phe Ala Pro Ala Asn  Thr Asp Ala Asn Asn  Ile Glu Gly
```

2420 2425 2430

Gln Ala Ile Leu Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys
2435 2440 2445

Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Leu Arg
2450 2455 2460

Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Val
2465 2470 2475

Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Lys Tyr Tyr Phe
2480 2485 2490

Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly Tyr Thr Ile Ile Ser
2495 2500 2505

Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly
2510 2515 2520

Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala Pro Ala Asn
2525 2530 2535

Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn
2540 2545 2550

Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn Asn
2555 2560 2565

Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
2570 2575 2580

Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr
2585 2590 2595

Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile
2600 2605 2610

Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala
2615 2620 2625

Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln
2630 2635 2640

Asn Arg Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn
2645 2650 2655

```
Asn Ser  Lys Ala Val Thr Gly  Trp Gln Thr Ile Asn  Gly Lys Val
    2660                 2665                 2670


Tyr Tyr  Phe Met Pro Asp Thr  Ala Met Ala Ala Ala  Gly Gly Leu
    2675                 2680                 2685


Phe Glu  Ile Asp Gly Val Ile  Tyr Phe Phe Gly Val  Asp Gly Val
    2690                 2695                 2700


Lys Ala  Pro Gly Ile Tyr Gly
    2705                 2710
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<210> 172
<211> 2366
<212> PRT
<213> Clostridia

<400> 172

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Met Ser Leu Val Asn Arg Lys Gln Leu Glu Lys Met Ala Asn Val Arg
1               5                   10                  15


Phe Arg Thr Gln Glu Asp Glu Tyr Val Ala Ile Leu Asp Ala Leu Glu
            20                  25                  30


Glu Tyr His Asn Met Ser Glu Asn Thr Val Val Glu Lys Tyr Leu Lys
        35                  40                  45


Leu Lys Asp Ile Asn Ser Leu Thr Asp Ile Tyr Ile Asp Thr Tyr Lys
    50                  55                  60


Lys Ser Gly Arg Asn Lys Ala Leu Lys Lys Phe Lys Glu Tyr Leu Val
65                  70                  75                  80


Thr Glu Val Leu Glu Leu Lys Asn Asn Asn Leu Thr Pro Val Glu Lys
                85                  90                  95


Asn Leu His Phe Val Trp Ile Gly Gly Gln Ile Asn Asp Thr Ala Ile
            100                 105                 110


Asn Tyr Ile Asn Gln Trp Lys Asp Val Asn Ser Asp Tyr Asn Val Asn
        115                 120                 125


Val Phe Tyr Asp Ser Asn Ala Phe Leu Ile Asn Thr Leu Lys Lys Thr
    130                 135                 140


Val Val Glu Ser Ala Ile Asn Asp Thr Leu Glu Ser Phe Arg Glu Asn
145                 150                 155                 160
```

```
Leu Asn Asp Pro Arg Phe Asp Tyr Asn Lys Phe Phe Arg Lys Arg Met
                165                 170                 175

Glu Ile Ile Tyr Asp Lys Gln Lys Asn Phe Ile Asn Tyr Tyr Lys Ala
            180                 185                 190

Gln Arg Glu Glu Asn Pro Glu Leu Ile Ile Asp Asp Ile Val Lys Thr
        195                 200                 205

Tyr Leu Ser Asn Glu Tyr Ser Lys Glu Ile Asp Glu Leu Asn Thr Tyr
    210                 215                 220

Ile Glu Glu Ser Leu Asn Lys Ile Thr Gln Asn Ser Gly Asn Asp Val
225                 230                 235                 240

Arg Asn Phe Glu Glu Phe Lys Asn Gly Glu Ser Phe Asn Leu Tyr Glu
                245                 250                 255

Gln Glu Leu Val Glu Arg Trp Asn Leu Ala Ala Ala Ser Asp Ile Leu
            260                 265                 270

Arg Ile Ser Ala Leu Lys Glu Ile Gly Gly Met Tyr Leu Asp Val Asp
        275                 280                 285

Met Leu Pro Gly Ile Gln Pro Asp Leu Phe Glu Ser Ile Glu Lys Pro
    290                 295                 300

Ser Ser Val Thr Val Asp Phe Trp Glu Met Thr Lys Leu Glu Ala Ile
305                 310                 315                 320

Met Lys Tyr Lys Glu Tyr Ile Pro Glu Tyr Thr Ser Glu His Phe Asp
                325                 330                 335

Met Leu Asp Glu Glu Val Gln Ser Ser Phe Glu Ser Val Leu Ala Ser
            340                 345                 350

Lys Ser Asp Lys Ser Glu Ile Phe Ser Ser Leu Gly Asp Met Glu Ala
        355                 360                 365

Ser Pro Leu Glu Val Lys Ile Ala Phe Asn Ser Lys Gly Ile Ile Asn
    370                 375                 380

Gln Gly Leu Ile Ser Val Lys Asp Ser Tyr Cys Ser Asn Leu Ile Val
385                 390                 395                 400

Lys Gln Ile Glu Asn Arg Tyr Lys Ile Leu Asn Asn Ser Leu Asn Pro
                405                 410                 415
```

```
Ala Ile Ser Glu Asp Asn Asp Phe Asn Thr Thr Thr Asn Thr Phe Ile
            420                 425                 430

Asp Ser Ile Met Ala Glu Ala Asn Ala Asp Asn Gly Arg Phe Met Met
        435                 440                 445

Glu Leu Gly Lys Tyr Leu Arg Val Gly Phe Phe Pro Asp Val Lys Thr
    450                 455                 460

Thr Ile Asn Leu Ser Gly Pro Glu Ala Tyr Ala Ala Ala Tyr Gln Asp
465                 470                 475                 480

Leu Leu Met Phe Lys Glu Gly Ser Met Asn Ile His Leu Ile Glu Ala
                485                 490                 495

Asp Leu Arg Asn Phe Glu Ile Ser Lys Thr Asn Ile Ser Gln Ser Thr
            500                 505                 510

Glu Gln Glu Met Ala Ser Leu Trp Ser Phe Asp Asp Ala Arg Ala Lys
        515                 520                 525

Ala Gln Phe Glu Glu Tyr Lys Arg Asn Tyr Phe Glu Gly Ser Leu Gly
    530                 535                 540

Glu Asp Asp Asn Leu Asp Phe Ser Gln Asn Ile Val Val Asp Lys Glu
545                 550                 555                 560

Tyr Leu Leu Glu Lys Ile Ser Ser Leu Ala Arg Ser Ser Glu Arg Gly
                565                 570                 575

Tyr Ile His Tyr Ile Val Gln Leu Gln Gly Asp Lys Ile Ser Tyr Glu
            580                 585                 590

Ala Ala Cys Asn Leu Phe Ala Lys Thr Pro Tyr Asp Ser Val Leu Phe
        595                 600                 605

Gln Lys Asn Ile Glu Asp Ser Glu Ile Ala Tyr Tyr Tyr Asn Pro Gly
    610                 615                 620

Asp Gly Glu Ile Gln Glu Ile Asp Lys Tyr Lys Ile Pro Ser Ile Ile
625                 630                 635                 640

Ser Asp Arg Pro Lys Ile Lys Leu Thr Phe Ile Gly His Gly Lys Asp
                645                 650                 655

Glu Phe Asn Thr Asp Ile Phe Ala Gly Phe Asp Val Asp Ser Leu Ser
            660                 665                 670
```

```
Thr Glu Ile Glu Ala Ala Ile Asp Leu Ala Lys Glu Asp Ile Ser Pro
        675                 680                 685

Lys Ser Ile Glu Ile Asn Leu Leu Gly Cys Asn Met Phe Ser Tyr Ser
    690                 695                 700

Ile Asn Val Glu Glu Thr Tyr Pro Gly Lys Leu Leu Leu Lys Val Lys
705                 710                 715                 720

Asp Lys Ile Ser Glu Leu Met Pro Ser Ile Ser Gln Asp Ser Ile Ile
                725                 730                 735

Val Ser Ala Asn Gln Tyr Glu Val Arg Ile Asn Ser Glu Gly Arg Arg
            740                 745                 750

Glu Leu Leu Asp His Ser Gly Glu Trp Ile Asn Lys Glu Glu Ser Ile
        755                 760                 765

Ile Lys Asp Ile Ser Ser Lys Glu Tyr Ile Ser Phe Asn Pro Lys Glu
    770                 775                 780

Asn Lys Ile Thr Val Lys Ser Lys Asn Leu Pro Glu Leu Ser Thr Leu
785                 790                 795                 800

Leu Gln Glu Ile Arg Asn Asn Ser Asn Ser Ser Asp Ile Glu Leu Glu
                805                 810                 815

Glu Lys Val Met Leu Thr Glu Cys Glu Ile Asn Val Ile Ser Asn Ile
            820                 825                 830

Asp Thr Gln Ile Val Glu Glu Arg Ile Glu Glu Ala Lys Asn Leu Thr
        835                 840                 845

Ser Asp Ser Ile Asn Tyr Ile Lys Asp Glu Phe Lys Leu Ile Glu Ser
    850                 855                 860

Ile Ser Asp Ala Leu Cys Asp Leu Lys Gln Gln Asn Glu Leu Glu Asp
865                 870                 875                 880

Ser His Phe Ile Ser Phe Glu Asp Ile Ser Glu Thr Asp Glu Gly Phe
                885                 890                 895

Ser Ile Arg Phe Ile Asn Lys Glu Thr Gly Glu Ser Ile Phe Val Glu
            900                 905                 910

Thr Glu Lys Thr Ile Phe Ser Glu Tyr Ala Asn His Ile Thr Glu Glu
```

915 920 925

Ile Ser Lys Ile Lys Gly Thr Ile Phe Asp Thr Val Asn Gly Lys Leu
930 935 940

Val Lys Lys Val Asn Leu Asp Thr Thr His Glu Val Asn Thr Leu Asn
945 950 955 960

Ala Ala Phe Phe Ile Gln Ser Leu Ile Glu Tyr Asn Ser Ser Lys Glu
965 970 975

Ser Leu Ser Asn Leu Ser Val Ala Met Lys Val Gln Val Tyr Ala Gln
980 985 990

Leu Phe Ser Thr Gly Leu Asn Thr Ile Thr Asp Ala Ala Lys Val Val
995 1000 1005

Glu Leu Val Ser Thr Ala Leu Asp Glu Thr Ile Asp Leu Leu Pro
1010 1015 1020

Thr Leu Ser Glu Gly Leu Pro Ile Ile Ala Thr Ile Ile Asp Gly
1025 1030 1035

Val Ser Leu Gly Ala Ala Ile Lys Glu Leu Ser Glu Thr Ser Asp
1040 1045 1050

Pro Leu Leu Arg Gln Glu Ile Glu Ala Lys Ile Gly Ile Met Ala
1055 1060 1065

Val Asn Leu Thr Thr Ala Thr Thr Ala Ile Ile Thr Ser Ser Leu
1070 1075 1080

Gly Ile Ala Ser Gly Phe Ser Ile Leu Leu Val Pro Leu Ala Gly
1085 1090 1095

Ile Ser Ala Gly Ile Pro Ser Leu Val Asn Asn Glu Leu Val Leu
1100 1105 1110

Arg Asp Lys Ala Thr Lys Val Val Asp Tyr Phe Lys His Val Ser
1115 1120 1125

Leu Val Glu Thr Glu Gly Val Phe Thr Leu Leu Asp Asp Lys Ile
1130 1135 1140

Met Met Pro Gln Asp Asp Leu Val Ile Ser Glu Ile Asp Phe Asn
1145 1150 1155

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Asn Asn  Ser Ile Val Leu Gly  Lys Cys Glu Ile Trp  Arg Met Glu
    1160                1165                1170

Gly Gly  Ser Gly His Thr Val  Thr Asp Asp Ile Asp  His Phe Phe
    1175                1180                1185

Ser Ala  Pro Ser Ile Thr Tyr  Arg Glu Pro His Leu  Ser Ile Tyr
    1190                1195                1200

Asp Val  Leu Glu Val Gln Lys  Glu Glu Leu Asp Leu  Ser Lys Asp
    1205                1210                1215

Leu Met  Val Leu Pro Asn Ala  Pro Asn Arg Val Phe  Ala Trp Glu
    1220                1225                1230

Thr Gly  Trp Thr Pro Gly Leu  Arg Ser Leu Glu Asn  Asp Gly Thr
    1235                1240                1245

Lys Leu  Leu Asp Arg Ile Arg  Asp Asn Tyr Glu Gly  Glu Phe Tyr
    1250                1255                1260

Trp Arg  Tyr Phe Ala Phe Ile  Ala Asp Ala Leu Ile  Thr Thr Leu
    1265                1270                1275

Lys Pro  Arg Tyr Glu Asp Thr  Asn Ile Arg Ile Asn  Leu Asp Ser
    1280                1285                1290

Asn Thr  Arg Ser Phe Ile Val  Pro Ile Ile Thr Thr  Glu Tyr Ile
    1295                1300                1305

Arg Glu  Lys Leu Ser Tyr Ser  Phe Tyr Gly Ser Gly  Gly Thr Tyr
    1310                1315                1320

Ala Leu  Ser Leu Ser Gln Tyr  Asn Met Gly Ile Asn  Ile Glu Leu
    1325                1330                1335

Ser Glu  Ser Asp Val Trp Ile  Ile Asp Val Asp Asn  Val Val Arg
    1340                1345                1350

Asp Val  Thr Ile Glu Ser Asp  Lys Ile Lys Lys Gly  Asp Leu Ile
    1355                1360                1365

Glu Gly  Ile Leu Ser Thr Leu  Ser Ile Glu Glu Asn  Lys Ile Ile
    1370                1375                1380

Leu Asn  Ser His Glu Ile Asn  Phe Ser Gly Glu Val  Asn Gly Ser
    1385                1390                1395
```

```
Asn Gly  Phe Val Ser Leu Thr  Phe Ser Ile Leu Glu  Gly Ile Asn
    1400                1405                1410

Ala Ile  Ile Glu Val Asp Leu  Leu Ser Lys Ser Tyr  Lys Leu Leu
    1415                1420                1425

Ile Ser  Gly Glu Leu Lys Ile  Leu Met Leu Asn Ser  Asn His Ile
    1430                1435                1440

Gln Gln  Lys Ile Asp Tyr Ile  Gly Phe Asn Ser Glu  Leu Gln Lys
    1445                1450                1455

Asn Ile  Pro Tyr Ser Phe Val  Asp Ser Glu Gly Lys  Glu Asn Gly
    1460                1465                1470

Phe Ile  Asn Gly Ser Thr Lys  Glu Gly Leu Phe Val  Ser Glu Leu
    1475                1480                1485

Pro Asp  Val Val Leu Ile Ser  Lys Val Tyr Met Asp  Asp Ser Lys
    1490                1495                1500

Pro Ser  Phe Gly Tyr Tyr Ser  Asn Asn Leu Lys Asp  Val Lys Val
    1505                1510                1515

Ile Thr  Lys Asp Asn Val Asn  Ile Leu Thr Gly Tyr  Tyr Leu Lys
    1520                1525                1530

Asp Asp  Ile Lys Ile Ser Leu  Ser Leu Thr Leu Gln  Asp Glu Lys
    1535                1540                1545

Thr Ile  Lys Leu Asn Ser Val  His Leu Asp Glu Ser  Gly Val Ala
    1550                1555                1560

Glu Ile  Leu Lys Phe Met Asn  Arg Lys Gly Asn Thr  Asn Thr Ser
    1565                1570                1575

Asp Ser  Leu Met Ser Phe Leu  Glu Ser Met Asn Ile  Lys Ser Ile
    1580                1585                1590

Phe Val  Asn Phe Leu Gln Ser  Asn Ile Lys Phe Ile  Leu Asp Ala
    1595                1600                1605

Asn Phe  Ile Ile Ser Gly Thr  Thr Ser Ile Gly Gln  Phe Glu Phe
    1610                1615                1620

Ile Cys  Asp Glu Asn Asp Asn  Ile Gln Pro Tyr Phe  Ile Lys Phe
    1625                1630                1635
```

```
Asn Thr  Leu Glu Thr Asn Tyr  Thr Leu Tyr Val Gly  Asn Arg Gln
    1640                1645                1650

Asn Met  Ile Val Glu Pro Asn  Tyr Asp Leu Asp Asp  Ser Gly Asp
    1655                1660                1665

Ile Ser  Ser Thr Val Ile Asn  Phe Ser Gln Lys Tyr  Leu Tyr Gly
    1670                1675                1680

Ile Asp  Ser Cys Val Asn Lys  Val Val Ile Ser Pro  Asn Ile Tyr
    1685                1690                1695

Thr Asp  Glu Ile Asn Ile Thr  Pro Val Tyr Glu Thr  Asn Asn Thr
    1700                1705                1710

Tyr Pro  Glu Val Ile Val Leu  Asp Ala Asn Tyr Ile  Asn Glu Lys
    1715                1720                1725

Ile Asn  Val Asn Ile Asn Asp  Leu Ser Ile Arg Tyr  Val Trp Ser
    1730                1735                1740

Asn Asp  Gly Asn Asp Phe Ile  Leu Met Ser Thr Ser  Glu Glu Asn
    1745                1750                1755

Lys Val  Ser Gln Val Lys Ile  Arg Phe Val Asn Val  Phe Lys Asp
    1760                1765                1770

Lys Thr  Leu Ala Asn Lys Leu  Ser Phe Asn Phe Ser  Asp Lys Gln
    1775                1780                1785

Asp Val  Pro Val Ser Glu Ile  Ile Leu Ser Phe Thr  Pro Ser Tyr
    1790                1795                1800

Tyr Glu  Asp Gly Leu Ile Gly  Tyr Asp Leu Gly Leu  Val Ser Leu
    1805                1810                1815

Tyr Asn  Glu Lys Phe Tyr Ile  Asn Asn Phe Gly Met  Met Val Ser
    1820                1825                1830

Gly Leu  Ile Tyr Ile Asn Asp  Ser Leu Tyr Tyr Phe  Lys Pro Pro
    1835                1840                1845

Val Asn  Asn Leu Ile Thr Gly  Phe Val Thr Val Gly  Asp Asp Lys
    1850                1855                1860

Tyr Tyr  Phe Asn Pro Ile Asn  Gly Gly Ala Ala Ser  Ile Gly Glu
```

1865 1870 1875

Thr Ile Ile Asp Asp Lys Asn Tyr Tyr Phe Asn Gln Ser Gly Val
1880 1885 1890

Leu Gln Thr Gly Val Phe Ser Thr Glu Asp Gly Phe Lys Tyr Phe
1895 1900 1905

Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly Glu Ala Ile
1910 1915 1920

Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr Tyr Phe
1925 1930 1935

Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys Glu Leu Asp Gly
1940 1945 1950

Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly
1955 1960 1965

Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly
1970 1975 1980

Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr
1985 1990 1995

Phe Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp
2000 2005 2010

Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly
2015 2020 2025

Val Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn
2030 2035 2040

Glu Asp Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly
2045 2050 2055

Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe
2060 2065 2070

Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr
2075 2080 2085

Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu
2090 2095 2100

```
Ile Asn  Asp Gly Gln Tyr Tyr  Phe Asn Asp Asp Gly  Ile Met Gln
    2105                 2110                 2115

Val Gly  Phe Val Thr Ile Asn  Asp Lys Val Phe Tyr  Phe Ser Asp
    2120                 2125                 2130

Ser Gly  Ile Ile Glu Ser Gly  Val Gln Asn Ile Asp  Asp Asn Tyr
    2135                 2140                 2145

Phe Tyr  Ile Asp Asp Asn Gly  Ile Val Gln Ile Gly  Val Phe Asp
    2150                 2155                 2160

Thr Ser  Asp Gly Tyr Lys Tyr  Phe Ala Pro Ala Asn  Thr Val Asn
    2165                 2170                 2175

Asp Asn  Ile Tyr Gly Gln Ala  Val Glu Tyr Ser Gly  Leu Val Arg
    2180                 2185                 2190

Val Gly  Glu Asp Val Tyr Tyr  Phe Gly Glu Thr Tyr  Thr Ile Glu
    2195                 2200                 2205

Thr Gly  Trp Ile Tyr Asp Met  Glu Asn Glu Ser Asp  Lys Tyr Tyr
    2210                 2215                 2220

Phe Asn  Pro Glu Thr Lys Lys  Ala Cys Lys Gly Ile  Asn Leu Ile
    2225                 2230                 2235

Asp Asp  Ile Lys Tyr Tyr Phe  Asp Glu Lys Gly Ile  Met Arg Thr
    2240                 2245                 2250

Gly Leu  Ile Ser Phe Glu Asn  Asn Asn Tyr Tyr Phe  Asn Glu Asn
    2255                 2260                 2265

Gly Glu  Met Gln Phe Gly Tyr  Ile Asn Ile Glu Asp  Lys Met Phe
    2270                 2275                 2280

Tyr Phe  Gly Glu Asp Gly Val  Met Gln Ile Gly Val  Phe Asn Thr
    2285                 2290                 2295

Pro Asp  Gly Phe Lys Tyr Phe  Ala His Gln Asn Thr  Leu Asp Glu
    2300                 2305                 2310

Asn Phe  Glu Gly Glu Ser Ile  Asn Tyr Thr Gly Trp  Leu Asp Leu
    2315                 2320                 2325

Asp Glu  Lys Arg Tyr Tyr Phe  Thr Asp Glu Tyr Ile  Ala Ala Thr
    2330                 2335                 2340
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Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp Pro Asp
2345 2350 2355

Thr Ala Gln Leu Val Ile Ser Glu
2360 2365

<210> 173
<211> 18
<212> PRT
<213> Artificial

<220>
<223> Fragment from C. difficile toxin TcdB

<400> 173

Ser Pro Val Glu Lys Asn Leu His Phe Val Trp Ile Gly Gly Glu Val
1 5 10 15

Ser Asp

<210> 174
<211> 11
<212> PRT
<213> Artificial

<220>
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<400> 174

Asn Leu Ala Ala Ala Ser Asp Ile Val Arg Leu
1 5 10

<210> 175
<211> 15
<212> PRT
<213> Artificial

<220>
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<400> 175

Cys Gly Gly Val Tyr Leu Asp Val Asp Met Leu Pro Gly Ile His
1 5 10 15

<210> 176
<211> 20
<212> PRT
<213> Artificial

<220>
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<400> 176

Cys Gly Gly Val Tyr Leu Asp Val Asp Met Leu Pro Gly Ile His Ser
1 5 10 15

Asp Leu Phe Lys
20

<210> 177
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Fragment of C. difficile toxin TcdB

<400> 177

Cys Trp Glu Met Ile Lys Leu Glu Ala Ile Met Lys Tyr Lys
1 5 10

<210> 178
<211> 12
<212> PRT
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<220>
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<400> 178

Cys Thr Asn Leu Val Ile Glu Gln Val Lys Asn Arg
1 5 10

<210> 179
<211> 12
<212> PRT
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<220>
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<400> 179

Pro Glu Ala Arg Ser Thr Ile Ser Leu Ser Gly Pro
1 5 10

<210> 180
<211> 12
<212> PRT
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<220>
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<400> 180

Cys Ser Asn Leu Ile Val Lys Gln Ile Glu Asn Arg

1 5 10

<210> 181
<211> 14
<212> PRT
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<220>
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<400> 181

Thr Glu Gln Glu Ile Asn Ser Leu Trp Ser Phe Asp Gln Ala
1 5 10

<210> 182
<211> 25
<212> PRT
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<220>
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<400> 182

Thr Glu Gln Glu Ile Asn Ser Leu Trp Ser Phe Asp Pro Glu Ala Arg
1 5 10 15

Ser Thr Ile Ser Leu Ser Gly Pro Cys
20 25

<210> 183
<211> 13
<212> PRT
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<220>
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<400> 183

Asn Val Glu Glu Thr Tyr Pro Gly Lys Leu Leu Leu Cys
1 5 10

<210> 184
<211> 14
<212> PRT
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<220>
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<400> 184

Cys Ala Asn Gln Tyr Glu Val Arg Ile Asn Ser Glu Gly Arg
1 5 10

<210> 185
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Fragment of C. difficile toxin TcdB

<400> 185

Val Asn Thr Leu Asn Ala Ala Phe Phe Ile Gln Ser Leu Ile Cys
1 5 10 15

<210> 186
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Fragment of C. difficile toxin TcdB

<400> 186

Tyr Ala Gln Leu Phe Ser Thr Gly Leu Asn Thr Ile Cys
1 5 10

<210> 187
<211> 16
<212> PRT
<213> Artificial

<220>
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<400> 187

Cys Ala Gly Ile Ser Ala Gly Ile Pro Ser Leu Val Asn Asn Glu Leu
1 5 10 15

<210> 188
<211> 16
<212> PRT
<213> Artificial

<220>
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<400> 188

Asp Asp Leu Val Ile Ser Glu Ile Asp Phe Asn Asn Asn Ser Ile Cys
1 5 10 15

<210> 189
<211> 10
<212> PRT
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<220>
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<400> 189

Met Glu Gly Gly Ser Gly His Thr Val Thr
1 5 10

<210> 190
<211> 35
<212> PRT
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<220>
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<400> 190

Ala Val Asn Asp Thr Ile Asn Val Leu Pro Thr Ile Thr Glu Gly Ile
1 5 10 15

Pro Ile Val Ser Thr Ile Leu Asp Gly Ile Asn Leu Gly Ala Ala Ile
20 25 30

Lys Glu Leu
35

<210> 191
<211> 20
<212> PRT
<213> Artificial

<220>
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<400> 191

Cys Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
1 5 10 15

Glu Gly Gln Ala
20

<210> 192
<211> 20
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<220>
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<400> 192

Cys Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn Ile
1 5 10 15

Tyr Gly Gln Ala
20

<210> 193
<211> 12
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<400> 193

Cys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Glu Ala
1 5 10

<210> 194
<211> 12
<212> PRT
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<220>
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<400> 194

Cys Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala
1 5 10