SEQUENCE LISTING

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<120> ANTI-PATHOGENIC AGENTS

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<170> PatentIn version 3.5

<210> 1
<211> 6
<212> PRT
<213> artificial

<220>
<223> Generic amino acid sequence of Loop 1B region

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> X1 = G, D, H, K, A, E, Q, T, P, L, M, S or R

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> X2 = K, R, G, H, L, N, F, I, S, T or Y

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> X3 = W, Y, H, L, G, F or P

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> X4 = K, S, R, H, T, E, V, N, Q, D, G or X

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> X5 = S, K, Y, F, G or H

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> X6 = P, V, L, T, A, F, N, K, R, M, G, H, I or Y

<400> 1

Xaa1 Xaa2 Xaa3 Xaa4 Xaa5 Xaa6
1 5

<210> 2
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of NaD1 (Nicotiana alata) containing Loop 1B

<400> 2

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

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 3
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of PhD1 (Petunia hybrida) containing Loop 1B

<400> 3

Ala Thr Cys Lys Ala Glu Cys Pro Thr Trp Asp Ser Val Cys Ile Asn
1 5 10 15

Lys Lys Pro Cys Val Ala Cys Cys Lys Lys Ala Lys Phe Ser Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Glu Cys
35 40 45

<210> 4
<211> 49
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of PhD2 (Petunia hybrida) containing Loop 1B

<400> 4

Gly Thr Cys Lys Ala Glu Cys Pro Thr Trp Glu Gly Ile Cys Ile Asn
1 5 10 15

Lys Ala Pro Cys Val Lys Cys Cys Lys Ala Gln Pro Glu Lys Phe Thr
20 25 30

Asp Gly His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro
35 40 45

Cys

<210> 5
<211> 48
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of TPP3 (Solanum lycopersicum) containing Loop 1B

<400> 5

Gln Gln Ile Cys Lys Ala Pro Ser Gln Thr Phe Pro Gly Leu Cys Phe
1 5 10 15

Met Asp Ser Ser Cys Arg Lys Tyr Cys Ile Lys Glu Lys Phe Thr Gly
20 25 30

Gly His Cys Ser Lys Leu Gln Arg Lys Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 6
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of FST (Nicotiana tabacum) containing Loop 1B

<400> 6

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

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Leu Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 7
<211> 45
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of g-thionin (Nicotiana excelsior) containing Loop B1 [NeThio1]

<400> 7

Arg Glu Cys Ala Arg Glu Ile Phe Thr Gly Leu Cys Ile Thr Asn Pro
1 5 10 15

Gln Cys Arg Lys Ala Cys Ile Lys Glu Lys Phe Thr Asp Gly His Cys
20 25 30

Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 8
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of g-thionin (Nicotiana excelsior) containing Loop 1B [NeThio2]

<400> 8

Lys Asp Cys Lys Thr Glu Ser Asn Thr Phe Pro Gly Ile Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Lys Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 9
<211> 48
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of g-thionin (Nicotiana attenuata) containing Loop 1B [Na-gth]

<400> 9

Lys Ser Thr Cys Lys Ala Glu Ser Asn Thr Phe Glu Gly Phe Cys Val
1 5 10 15

Thr Lys Pro Pro Cys Arg Arg Ala Cys Leu Lys Glu Lys Phe Thr Asp
20 25 30

Gly Lys Cys Ser Lys Ile Leu Arg Arg Cys Ile Cys Tyr Lys Pro Cys
35 40 45

<210> 10
<211> 48
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of g-thionin (Nicotiana paniculata) containing Loop 1B [NpThio1]

<400> 10

Lys Ser Thr Cys Lys Ala Glu Ser Asn Thr Phe Pro Gly Leu Cys Ile
1 5 10 15

Thr Lys Pro Pro Cys Arg Lys Ala Cys Leu Ser Glu Lys Phe Thr Asp
20 25 30

Gly Lys Cys Ser Lys Ile Leu Arg Arg Cys Ile Cys Tyr Lys Pro Cys
35 40 45

<210> 11
<211> 50
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of portion of g-thionin (Capicum chinense) containing Loop 1B [Cc-gth]

<400> 11

Gln Asn Asn Ile Cys Lys Thr Thr Ser Lys His Phe Lys Gly Leu Cys
1 5 10 15

Phe Ala Asp Ser Lys Cys Arg Lys Val Cys Ile Gln Glu Asp Lys Phe
20 25 30

Glu Asp Gly His Cys Ser Lys Leu Gln Arg Lys Cys Leu Cys Thr Lys
35 40 45

Asn Cys
50

<210> 12
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from NaD1

<400> 12

Asn Thr Phe Pro Gly Ile
1 5

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

<220>
<223> Amino acid sequence of Loop 1B from PhD1

<400> 13

Pro Thr Trp Asp Ser Val
1 5

<210> 14
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from PhD2

<400> 14

Pro Thr Trp Glu Gly Ile
1 5

<210> 15
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B TPP3

<400> 15

Gln Thr Phe Pro Gly Leu
1 5

<210> 16
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B FST

<400> 16

Asn Thr Phe Pro Gly Ile
1 5

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

<220>
<223> Amino acid sequence of Loop 1B g-thionin (N. excelsior) [NeThio1]

<400> 17

Ile Ser Thr Gly Leu
1 5

<210> 18
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B g-thionin (N. excelsior) [NeThio2]

<400> 18

Asn Thr Phe Pro Gly Ile
1 5

<210> 19
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B g-thionin (N. attenuata) [Na-gth]

<400> 19

Asn Thr Phe Glu Gly Phe
1 5

<210> 20
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B g-thionin (N. paniculata) [NpThio1]

<400> 20

Asn Thr Phe Pro Gly Leu
1 5

<210> 21
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B g-thionin (C. chinense) [Cc-gth]

<400> 21

Lys His Phe Lys Gly Leu
1 5

<210> 22
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin NaD2 containing Loop 1B

<400> 22

Arg Thr Cys Glu Ser Gln Ser His Arg Phe Lys Gly Pro Cys Ala Arg
1 5 10 15

Asp Ser Asn Cys Ala Thr Val Cys Leu Thr Glu Gly Phe Ser Gly Gly
20 25 30

Asp Cys Arg Gly Phe Arg Arg Arg Cys Phe Cys Thr Arg Pro Cys
35 40 45

<210> 23
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin g1-H containing Loop 1B

<400> 23

Arg Ile Cys Arg Arg Arg Ser Ala Gly Phe Lys Gly Pro Cys Val Ser
1 5 10 15

Asn Lys Asn Cys Ala Gln Val Cys Met Gln Glu Gly Trp Gly Gly Gly
20 25 30

Asn Cys Asp Gly Pro Leu Arg Arg Cys Lys Cys Met Arg Arg Cys
35 40 45

<210> 24
<211> 46
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin Psd1 containing Loop 1B

<400> 24

Lys Thr Cys Glu His Leu Ala Asp Thr Tyr Arg Gly Val Cys Phe Thr
1 5 10 15

Asn Ala Ser Cys Asp Asp His Cys Lys Asn Lys Ala His Leu Ile Ser
20 25 30

Gly Thr Cys His Asn Trp Lys Cys Phe Cys Thr Gln Asn Cys
35 40 45

<210> 25
<211> 45
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin MsDef1 containing Loop 1B

<400> 25

Arg Thr Cys Glu Asn Leu Ala Asp Lys Tyr Arg Gly Pro Cys Phe Ser
1 5 10 15

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

Cys Arg Asp Asp Phe Arg Cys Trp Cys Thr Lys Arg Cys
35 40 45

<210> 26
<211> 50
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin DmAMP1 containing Loop 1B

<400> 26

Glu Leu Cys Glu Lys Ala Ser Lys Thr Trp Ser Gly Asn Cys Gly Asn
1 5 10 15

Thr Gly His Cys Asp Asn Gln Cys Lys Ser Trp Glu Gly Ala Ala His
20 25 30

Gly Ala Cys His Val Arg Asn Gly Lys His Met Cys Phe Cys Tyr Phe
35 40 45

Asn Cys
50

<210> 27
<211> 51
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin RsAFP2 containing Loop 1B

<400> 27

Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg
20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr
35 40 45

Phe Pro Cys
50

<210> 28
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of defensin g-zeathionin2 (Zea2) containing Loop 1B

<400> 28

Arg Val Cys Met Gly Lys Ser Gln His His Ser Phe Pro Cys Ile Ser
1 5 10 15

Asp Arg Leu Cys Ser Asn Glu Cys Val Lys Glu Asp Gly Gly Trp Thr
20 25 30

Ala Gly Tyr Cys His Leu Arg Tyr Cys Arg Cys Gln Lys Ala Cys
35 40 45

<210> 29
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from NaD2

<400> 29

His Arg Phe Lys Gly Pro
1 5

<210> 30
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from Zea2

<400> 30

Gln His His Ser Phe Pro
1 5

<210> 31
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from PsD1

<400> 31

Asp Thr Tyr Arg Gly Val
1 5

<210> 32
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from PsD2

<400> 32

Pro Thr Trp Glu Gly Ile
1 5

<210> 33
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from MsDef1

<400> 33

Asp Lys Tyr Arg Gly Pro
1 5

<210> 34
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from SoD2

<400> 34

Lys Thr Phe Lys Gly Ile
1 5

<210> 35
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from DmAMP1

<400> 35

Lys Thr Trp Ser Gly Asn
1 5

<210> 36
<211> 5
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from VrD1

<400> 36

Glu Gly Trp Gly Lys
1 5

<210> 37
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from RsAFP2

<400> 37

Gly Thr Trp Ser Gly Val
1 5

<210> 38
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from g1-H

<400> 38

Ala Gly Phe Lys Gly Pro
1 5

<210> 39
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP4 (NaD2 Loop 1B [NaD2L1B] in NaD1)

<400> 39

Arg Glu Cys Lys Thr Glu Ser His Arg Phe Lys Gly Pro Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 40
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP34 (Zea2 Loop 1B [Zea2L1B] in NaD1)

<400> 40

Arg Glu Cys Lys Thr Glu Ser Gln His His Ser Phe Pro Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 41
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP35 (PsD1 Loop 1B [PsDL1B] in NaD1)

<400> 41

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

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 42
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP91 (MsDeF1 Loop 1B [MsDef1L1B] in NaD1)

<400> 42

Arg Glu Cys Lys Thr Glu Ser Asp Lys Tyr Arg Gly Pro Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 43
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP92 (SoD1 Loop 1B [SoD1L1B] in NaD1)

<400> 43

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

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 44
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP58 (DmAMP1 Loop 1B [DMAMPL1B] in NaD1)

<400> 44

Arg Glu Cys Lys Thr Glu Ser Lys Thr Trp Ser Gly Asn Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 45
<211> 46
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP37 (VrD1 Loop 1B [VrD1L1B] in NaD1)

<400> 45

Arg Glu Cys Lys Thr Glu Ser Glu Gly Trp Gly Lys Cys Ile Thr Lys
1 5 10 15

Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly His
20 25 30

Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 46
<211> 49
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP72 (NaD2 Loop 1B [NaD2L1B] in PhD2)

<400> 46

Gly Thr Cys Lys Ala Glu Cys His Arg Phe Lys Gly Pro Cys Ile Asn
1 5 10 15

Lys Ala Pro Cys Val Lys Cys Cys Lys Ala Gln Pro Glu Lys Phe Thr
20 25 30

Asp Gly His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro
35 40 45

Cys

<210> 47
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HXP95 (NaD2 Loop 1B [NaD2L1B] in NsD1

<400> 47

Lys Asp Cys Lys Arg Glu Ser His Arg Phe Lys Gly Pro Cys Ile Thr
1 5 10 15

Lys Leu Pro Cys Arg Arg Ala Cys Ile Ser Glu Lys Phe Ala Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 48
<211> 141
<212> DNA
<213> artificial

<220>
<223> Nucleotide sequence encoding defensin from Nicotiana suaveolens

<400> 48
aaagattgca aaagagaaag caatacattc cctggaatat gcattaccaa accaccatgc 60

agaaaagctt gtatccgtga gaaatttact gatggtcatt gtagcaaaat cctcagaaga 120

tgtctatgca ctaagccatg t 141

<210> 49
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of NsD1

<400> 49

Lys Asp Cys Lys Arg Glu Ser Asn Thr Phe Pro Gly Ile Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Arg Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 50
<211> 141
<212> DNA
<213> artificial

<220>
<223> Nucleotide sequence encoding NsD2 from Nicotiana suaveolens

<400> 50
aaagattgca aaagagaaag caatacattc cctggaatat gcattaccaa actaccatgc 60

agaagagctt gtatcagtga gaaatttgct gatggtcatt gtagcaaaat cctcagaagg 120

tgtctatgca ctaagccatg t 141

<210> 51
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence encoding NsD2

<400> 51

Lys Asp Cys Lys Arg Glu Ser Asn Thr Phe Pro Gly Ile Cys Ile Thr
1 5 10 15

Lys Leu Pro Cys Arg Arg Ala Cys Ile Ser Glu Lys Phe Ala Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 52
<211> 20
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of C-terminal end amino acid sequence of NaD1 which ends and includes the most C-terminal invariant cysteine residue

<400> 52

Lys Phe Thr Asp Gly His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys
1 5 10 15

Thr Lys Pro Cys
20

<210> 53
<211> 33
<212> PRT
<213> artificial sequence

<220>
<223> Amino acid sequence of NaD1 C-terminal tail

<400> 53

Val Phe Asp Glu Lys Met Thr Lys Thr Gly Ala Glu Ile Leu Ala Glu
1 5 10 15

Glu Ala Lys Thr Leu Ala Ala Ala Leu Leu Glu Glu Glu Ile Met Asp
20 25 30

Asn

<210> 54
<211> 6
<212> PRT
<213> artificial sequence

<220>
<223> Amino acid sequence of variable region of Loop 1B region

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> Xaa1 = NGDHKAEQTPLMSR

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> Xaa2 = KRGHLNFISTY

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Xaa3 = WYHLGFP

<220>
<221> MISC_FEATURE
<222> (4)..(3)
<223> Xaa4 = PKSRHTEVNQDG

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> MISC_FEATURE
<222> (5)..(3)
<223> Xaa5 = SKYFGH

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> Xaa6 = PVLTAFNKRMGHIY

<400> 54

Xaa1 Xaa2 Xaa3 Xaa4 Xaa5 Xaa6
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<210> 55
<211> 6
<212> PRT
<213> artificial sequence

<220>
<223> Amino acid sequence of variable region of Loop 1B region

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> Xaa1 = NHQDKE

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> Xaa2 = RHTKG

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Xaa3 = FHYW

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Xaa4 = PKSR

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> Xaa5 = GF

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> Xaa6 = PVIN

<400> 55

Xaa1 Xaa2 Xaa3 Xaa4 Xaa5 Xaa6
1 5

<210> 56
<211> 6
<212> PRT
<213> artificial sequence

<220>
<223> Amino acid sequence of variable region of Loop 1B region

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> Xaa1 = LFSIAHYQDKG

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> Xaa2 = SVFIKLAPNTRHG

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Xaa3 = AFWNISYPLH

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Xaa4 = KGERAPFQVS

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> Xaa5 = MGKDSYPENF

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> Xaa6 = VTMSWAPGEKLHIN

<400> 56

Xaa1 Xaa2 Xaa3 Xaa4 Xaa5 Xaa6
1 5

<210> 57
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of NaD1 backbone having a Loop 1B defined by X1 through X6

<220>
<221> MISC_FEATURE
<222> (8)..(8)
<223> Xaa1 = LFSIAHYQDKG

<220>
<221> MISC_FEATURE
<222> (9)..(9)
<223> Xaa2 = SVFIKLAPNTRHG

<220>
<221> MISC_FEATURE
<222> (10)..(10)
<223> Xaa3 = AFWNISYPLH

<220>
<221> MISC_FEATURE
<222> (11)..(11)
<223> Xaa4 = KGERAPFQVS

<220>
<221> MISC_FEATURE
<222> (12)..(12)
<223> Xaa5 = MGKDSYPENF

<220>
<221> MISC_FEATURE
<222> (13)..(13)
<223> Xaa6 = VTMSWAPGEKLHIN

<400> 57

Arg Glu Cys Lys Thr Glu Ser Xaa1 Xaa2 Xaa3 Xaa4 Xaa5 Xaa6 Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 58
<211> 49
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of C20

<400> 58

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

Thr Asp Ser Ser Cys Arg Lys Val Cys Ile Glu Lys Asp Lys Phe Glu
20 25 30

Asp Gly His Cys Ser Lys Leu Gln Arg Lys Cys Leu Cys Thr Lys Leu
35 40 45

Cys

<210> 59
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of SL549

<400> 59

Lys Asp Cys Lys Arg Glu Ser Asn Thr Phe Pro Gly Ile Cys Leu Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Lys Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 60
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of Loop 1B from C20

<400> 60

Lys Tyr Phe Lys Gly Leu
1 5

<210> 61
<211> 72
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of NaPin1A

<400> 61

Gln Ser Gly Cys Pro Gly Val Thr Lys Glu Arg Trp Pro Glu Leu Leu
1 5 10 15

Gly Thr Pro Ala Lys Phe Ala Met Gln Ile Ile Gln Lys Glu Asn Pro
20 25 30

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

Asp Leu Arg Cys Asn Arg Val Arg Leu Phe Val Asn Val Leu Asp Phe
50 55 60

Val Val Gln Thr Pro Gln Val Gly
65 70

<210> 62
<211> 65
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of BPTI

<400> 62

Arg Pro Asp Phe Cys Leu Glu Pro Pro Tyr Thr Gly Pro Cys Lys Ala
1 5 10 15

Arg Ile Ile Arg Tyr Phe Tyr Asn Ala Lys Ala Gly Leu Cys Gln Thr
20 25 30

Phe Val Tyr Gly Gly Cys Arg Ala Lys Arg Asn Asn Phe Lys Ser Ala
35 40 45

Glu Asp Cys Met Arg Thr Cys Gly Gly Ala Ile Gly Pro Trp Glu Asn
50 55 60

Leu
65

<210> 63
<211> 83
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of CI-1B

<400> 63

Met Arg Ser Met Glu Gly Ser Val Pro Lys Tyr Pro Glu Pro Thr Glu
1 5 10 15

Gly Ser Ile Gly Ala Ser Gly Ala Lys Arg Ser Trp Pro Glu Val Val
20 25 30

Gly Met Ser Ala Glu Lys Ala Lys Glu Ile Ile Leu Arg Asp Lys Pro
35 40 45

Asp Ala Gln Ile Glu Val Ile Pro Val Asp Ala Met Val Pro Leu Asp
50 55 60

Phe Asn Pro Asn Arg Ile Phe Ile Leu Val Ala Val Ala Arg Thr Pro
65 70 75 80

Thr Val Gly

<210> 64
<211> 235
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HVCPI6

<400> 64

Met Arg Val Ile Arg Ser Arg Ala Ile Leu Ile Val Leu Phe Leu Val
1 5 10 15

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

Glu Glu Met Ala Thr Leu Gly Gly Val His Asp Ser His Gly Ser Ser
35 40 45

Gln Asn Ser Asp Glu Ile His Ser Leu Ala Lys Phe Ala Val Asp Glu
50 55 60

His Asn Lys Lys Glu Asn Ala Met Ile Glu Leu Ala Arg Val Val Lys
65 70 75 80

Ala Gln Glu Gln Thr Val Ala Gly Lys Leu His His Leu Thr Leu Glu
85 90 95

Val Met Asp Ala Gly Lys Lys Lys Leu Tyr Glu Ala Lys Val Trp Val
100 105 110

Lys Pro Trp Leu Asn Phe Lys Glu Leu Gln Glu Phe Lys His Val Glu
115 120 125

Asp Val Pro Thr Phe Thr Ser Ser Asp Leu Gly Val Lys Gln Val Glu
130 135 140

Gln Asn Ser Gly Leu Lys Ser Val Pro Val His Asp Pro Val Val Glu
145 150 155 160

Glu Ala Ala Glu His Ala Ile Lys Thr Ile Gln Gln Arg Ser Asn Ser
165 170 175

Ile His Pro Tyr Lys Leu Gln Glu Ile Val His Ala Asn Ala Glu Met
180 185 190

Ala Asp Asp Ser Thr Lys Leu His Leu Val Ile Lys Thr Ser Arg Gly
195 200 205

Gly Lys Glu Glu Lys Phe Lys Val Gln Val Gln His Asn Asn Glu Gly
210 215 220

Ala Phe His Leu Asn Arg Met Glu Pro Asp Asn
225 230 235

<210> 65
<211> 102
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of S1Cys9

<400> 65

Met Ser Ser Asp Gly Gly Pro Val Leu Gly Gly Val Glu Pro Val Gly
1 5 10 15

Asn Glu Asn Asp Leu His Leu Val Asp Leu Ala Arg Phe Ala Val Thr
20 25 30

Glu His Asn Lys Lys Ala Asn Ser Leu Leu Glu Phe Glu Lys Leu Val
35 40 45

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

Glu Val Lys Glu Gly Asp Ala Lys Lys Leu Tyr Glu Ala Lys Val Trp
65 70 75 80

Glu Lys Pro Trp Met Asp Phe Lys Glu Leu Gln Glu Phe Lys Pro Val
85 90 95

Asp Ala Ser Ala Asn Ala
100

<210> 66
<211> 102
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of OsIa

<400> 66

Ala Thr Ser Ala Leu Gly Arg Arg Gly Val Leu Leu Gly Gly Trp Ser
1 5 10 15

Pro Val Lys Asp Val Asn Asp Pro His Val Gln Glu Leu Gly Gly Trp
20 25 30

Ala Val Ala Gln His Ala Ser Leu Ala Lys Asp Gly Leu Leu Phe Arg
35 40 45

Arg Val Thr Arg Gly Glu Gln Gln Val Val Ser Gly Met Asn Tyr Arg
50 55 60

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

Ala Gln Ile Tyr Glu His Trp Ser Arg Thr Arg Lys Leu Thr Ser Phe
85 90 95

Lys Pro Ala Ala Gly Gly
100

<210> 67
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 67

Leu Ser Phe Lys Gly Thr
1 5

<210> 68
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 68

Leu Val Phe Gly Gly Met
1 5

<210> 69
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 69

Tyr Asn Pro Val Gly Leu
1 5

<210> 70
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 70

Leu Phe Trp Glu Lys Ser
1 5

<210> 71
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 71

Ser Pro Phe Val Gly Pro
1 5

<210> 72
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 72

Ser Ile Ile Ala Ser Ala
1 5

<210> 73
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 73

Ile Lys Ala Pro Gly Trp
1 5

<210> 74
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 74

Leu Thr Leu Ser Asn His
1 5

<210> 75
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 75

Leu Ile Ser Phe Tyr Pro
1 5

<210> 76
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 76

Ala Leu Phe Ala Gly Glu
1 5

<210> 77
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 77

Phe Leu Tyr Arg Glu Lys
1 5

<210> 78
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 78

Phe Ile Phe Arg Met Glu
1 5

<210> 79
<211> 6
<212> PRT
<213> artificial

<220>
<223> Amino acid sequece of replacement Loop 1B identified following high through put screen

<400> 79

His Ala Phe Gln Lys Gly
1 5

<210> 80
<211> 381
<212> DNA
<213> artificial

<220>
<223> HvCPI6 for expression in corn

<400> 80
atggccaaca agcacctgtc cctctccctc ttcctcgtgc tcctcggcct ctccgcctcc 60

ctcgcctccg gagccacctc ggccctcggc cgccgcggcg tgcttctggg cgggtggagc 120

cccgtcaagg acgtgaacga cccgcacgtc caggagctag gcgggtgggc ggtggcccag 180

cacgccagcc tagccaagga cgggctgctc ttccgccggg tgacgcgcgg cgagcagcag 240

gtggtgtccg ggatgaacta ccgcctcttc gtggtcgcgg cggacggctc cggcaagagg 300

gtgacctatc tcgcgcagat ctacgagcac tggagcagga cccgcaagct cacgtccttc 360

aagccggctg ccggcggctg a 381

<210> 81
<211> 126
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HvCPI6 for expression in corn

<400> 81

Met Ala Asn Lys His Leu Ser Leu Ser Leu Phe Leu Val Leu Leu Gly
1 5 10 15

Leu Ser Ala Ser Leu Ala Ser Gly Ala Thr Ser Ala Leu Gly Arg Arg
20 25 30

Gly Val Leu Leu Gly Gly Trp Ser Pro Val Lys Asp Val Asn Asp Pro
35 40 45

His Val Gln Glu Leu Gly Gly Trp Ala Val Ala Gln His Ala Ser Leu
50 55 60

Ala Lys Asp Gly Leu Leu Phe Arg Arg Val Thr Arg Gly Glu Gln Gln
65 70 75 80

Val Val Ser Gly Met Asn Tyr Arg Leu Phe Val Val Ala Ala Asp Gly
85 90 95

Ser Gly Lys Arg Val Thr Tyr Leu Ala Gln Ile Tyr Glu His Trp Ser
100 105 110

Arg Thr Arg Lys Leu Thr Ser Phe Lys Pro Ala Ala Gly Gly
115 120 125

<210> 82
<211> 636
<212> DNA
<213> artificial

<220>
<223> HvCPI6-L-HXP4-CTPP

<400> 82
atggccaaca agcacctgtc cctctccctc ttcctcgtgc tcctcggcct ctccgcctcc 60

ctcgcctccg gagccacctc ggccctcggc cgccgcggcg tgcttctggg cgggtggagc 120

cccgtcaagg acgtgaacga cccgcacgtc caggagctag gcgggtgggc ggtggcccag 180

cacgccagcc tagccaagga cgggctgctc ttccgccggg tgacgcgcgg cgagcagcag 240

gtggtgtccg ggatgaacta ccgcctcttc gtggtcgcgg cggacggctc cggcaagagg 300

gtgacctatc tcgcgcagat ctacgagcac tggagcagga cccgcaagct cacgtccttc 360

aagccggctg ccggcggcga ggagaagaag aacagggagt gcaaaacaga gagcaacacg 420

ttccctggca tctgcattac taagccaccg tgccgcaagg cctgcatctc cgaaaagttt 480

acagacgggc actgttccaa aatcctccgc aggtgcctct gcacgaagcc gtgcgttttc 540

gacgagaaga tgacgaagac tggggcggag attctcgctg aggaggccaa gactctggcg 600

gctgccctgc tggaagagga aattatggac aattga 636

<210> 83
<211> 211
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of HvCPI6-L-HXP4-CTPP

<400> 83

Met Ala Asn Lys His Leu Ser Leu Ser Leu Phe Leu Val Leu Leu Gly
1 5 10 15

Leu Ser Ala Ser Leu Ala Ser Gly Ala Thr Ser Ala Leu Gly Arg Arg
20 25 30

Gly Val Leu Leu Gly Gly Trp Ser Pro Val Lys Asp Val Asn Asp Pro
35 40 45

His Val Gln Glu Leu Gly Gly Trp Ala Val Ala Gln His Ala Ser Leu
50 55 60

Ala Lys Asp Gly Leu Leu Phe Arg Arg Val Thr Arg Gly Glu Gln Gln
65 70 75 80

Val Val Ser Gly Met Asn Tyr Arg Leu Phe Val Val Ala Ala Asp Gly
85 90 95

Ser Gly Lys Arg Val Thr Tyr Leu Ala Gln Ile Tyr Glu His Trp Ser
100 105 110

Arg Thr Arg Lys Leu Thr Ser Phe Lys Pro Ala Ala Gly Gly Glu Glu
115 120 125

Lys Lys Asn Arg Glu Cys Lys Thr Glu Ser Asn Thr Phe Pro Gly Ile
130 135 140

Cys Ile Thr Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe
145 150 155 160

Thr Asp Gly His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys
165 170 175

Pro Cys Val Phe Asp Glu Lys Met Thr Lys Thr Gly Ala Glu Ile Leu
180 185 190

Ala Glu Glu Ala Lys Thr Leu Ala Ala Ala Leu Leu Glu Glu Glu Ile
195 200 205

Met Asp Asn
210

<210> 84
<211> 47
<212> PRT
<213> artificial

<220>
<223> Amino acid sequence of NaD1 backbone having a Loop 1B defined by X1 through X6

<220>
<221> MISC_FEATURE
<222> (8)..(8)
<223> Xaa1 = NHQDKE

<220>
<221> MISC_FEATURE
<222> (9)..(9)
<223> Xaa2 = RHTKG

<220>
<221> MISC_FEATURE
<222> (10)..(10)
<223> Xaa3 = FHYW

<220>
<221> MISC_FEATURE
<222> (11)..(11)
<223> Xaa4 = PKSR

<220>
<221> MISC_FEATURE
<222> (12)..(12)
<223> Xaa5 = GF

<220>
<221> MISC_FEATURE
<222> (13)..(13)
<223> Xaa6 = PVIN

<400> 84

Arg Glu Cys Lys Thr Glu Ser Xaa1 Xaa2 Xaa3 Xaa4 Xaa5 Xaa6 Cys Ile Thr
1 5 10 15

Lys Pro Pro Cys Arg Lys Ala Cys Ile Ser Glu Lys Phe Thr Asp Gly
20 25 30

His Cys Ser Lys Ile Leu Arg Arg Cys Leu Cys Thr Lys Pro Cys
35 40 45

<210> 85
<211> 48
<212> PRT
<213> artificial

<220>
<223> TPP3 backbone with NaD2 Loop 1B

<400> 85

Gln Gln Ile Cys Lys Ala Pro Ser His Arg Phe Lys Gly Pro Cys Phe
1 5 10 15

Met Asp Ser Ser Cys Arg Lys Tyr Cys Ile Lys Glu Lys Phe Thr Gly
20 25 30

Gly His Cys Ser Lys Leu Gln Arg Lys Cys Leu Cys Thr Lys Pro Cys
35 40 45