

HEPCIDIN AND MINI-HEPCIDIN ANALOGUES AND USES THEREOF

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 62/018,382, filed on June 27, 2014, which is incorporated by reference herein in its entirety.

SEQUENCE LISTING

[0001a] The instant application contains a Sequence Listing which has been submitted electronically in ASCII format and is hereby incorporated by reference in its entirety. Said ASCII copy, created on October 5, 2015, is named PPTH-00501WO_SL.txt and is 250,199 bytes in size.

FIELD OF THE INVENTION

[0002] The present invention relates, inter alia, to certain hepcidin peptide analogues, including both peptide monomers and peptide dimers, and conjugates and derivatives thereof, as well as compositions comprising the peptide analogues, and to the use of the peptide analogues in the treatment and/or prevention of a variety of diseases, conditions or disorders, including treatment and/or prevention of iron overload diseases such as hereditary hemochromatosis, iron-loading anemias, and other conditions and disorders described herein.

BACKGROUND

[0003] Hepcidin (also referred to as LEAP-1), a peptide hormone produced by the liver, is a regulator of iron homeostasis in humans and other mammals. Hepcidin acts by binding to its receptor, the iron export channel ferroportin, causing its internalization and degradation. Human hepcidin is a 25-amino acid peptide (Hep25). See Krause et al. (2000) FEBS Lett 480:147-150, and Park et al. (2001) J Biol Chem 276:7806-7810. The structure of the bioactive 25-amino acid form of hepcidin is a simple hairpin with 8 cysteines that form 4 disulfide bonds as described by Jordan et al. J Biol Chem 284:24155-67. The N terminal region is required for iron-regulatory function, and deletion of 5 N-terminal amino acid residues results in a loss of iron-regulatory function. See Nemeth et al. (2006) Blood 107:328-33.

[0004] Abnormal hepcidin activity is associated with iron overload diseases, including hereditary hemochromatosis (HH) and iron-loading anemias. Hereditary hemochromatosis is a genetic iron overload disease that is mainly caused by hepcidin deficiency or in some cases by hepcidin resistance. This allows excessive absorption of iron from the diet and development of iron overload. Clinical manifestations of HH may include liver disease (e.g., hepatic cirrhosis and hepatocellular carcinoma), diabetes, and heart failure. Currently, the only treatment for HH is regular phlebotomy, which is very burdensome for the patients. Iron-loading anemias are hereditary anemias with ineffective erythropoiesis such as β -thalassemia, which are accompanied by severe iron overload. Complications from iron overload are the main cause of morbidity and mortality for these patients. Hepcidin

deficiency is the main cause of iron overload in non-transfused patients, and contributes to iron overload in transfused patients. The current treatment for iron overload in these patients is iron chelation which is very burdensome, sometimes ineffective, and accompanied by frequent side effects.

5 [0005] Hepcidin has a number of limitations which restrict its use as a drug, including a difficult synthesis process due in part to aggregation and precipitation of the protein during folding, which in turn leads to high cost of goods. What are needed in the art are compounds having hepcidin activity and also possessing other beneficial physical properties such as improved solubility, stability, and/or potency, so that hepcidin-like biologics might be
10 produced affordably, and used to treat hepcidin-related diseases and disorders such as, e.g., those described herein.

[0006] The present invention addresses such needs, providing novel peptide analogues, including both peptide monomer analogues and peptide dimer analogues, having hepcidin activity and also having other beneficial properties making the peptides of the present
15 invention suitable alternatives to hepcidin.

SUMMARY

[0007] The present disclosure generally relates to peptide analogues, including both monomer and dimers, exhibiting hepcidin activity and methods of using the same.

20 [0008] In some embodiments, the disclosure provides peptides, which may be isolated and/or purified, comprising, consisting essentially of, or consisting of, the following structural formula I:



[0009] or a pharmaceutically acceptable salt or solvate thereof,

25 [0010] wherein R^1 is hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing;

[0011] R^2 is OH or NH_2 ;

[0012] X is a peptide sequence having the formula Ia:

Y6 is Gly, Sarc, Glu, Lys, Arg, Ser, Lys, Ile, Ala, Pro, Val or absent;

Y7 is Trp, Lys, Gly, Ala, Ile, Val or absent;

Y8 is Val, Trp, His, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent;

Y9 is Val, Asp, Asn, Cys, Tyr or absent;

5 Y10 is Cys, Met, Lys, Arg, Tyr or absent;

Y11 is Arg, Met, Cys, Lys or absent; and

Y12 is Arg, Lys, Ala or absent.

[0016a] In one aspect, there is provided a hepcidin analogue having the structure of Formula I:

10
$$R^1-X-Y-R^2 \quad (I) \quad \text{SEQ ID NO:1}$$

or a pharmaceutically acceptable salt or solvate thereof,

wherein R^1 is hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing; R^2 is OH or NH_2 ;

15 X is a peptide sequence having the formula Ia:

$$X1-X2-X3-X4-X5-X6-X7-X8-X9-X10 \text{ (Ia)} \quad \text{SEQ ID NO:2}$$

wherein

X1 is Asp, Ser, Glu, Ida, pGlu, bhAsp, D-Asp or absent;

X2 is Thr, Ser, Lys, Glu, Pro, Ala or absent;

20 X3 is His, Ala, or Glu;

X4 is Phe, Ile or Dpa;

X5 is Pro, bhPro, Val, Glu, Sarc or Gly;

X6 is Cys or (D)-Cys;

X7 is absent or any amino acid except Ile, Cys or (D)-Cys;

25 X8 is absent or any amino acid except Cys or (D)-Cys;

X9 is Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent; and

X10 is Lys, Phe or absent; and

Y is absent or present;

provided that if Y is present, Y is a peptide having the formula Im:

30
$$Y1-Y2-Y3-Y4-Y5-Y6-Y7-Y8-Y9-Y10-Y11-Y12 \text{ (Im)} \quad \text{SEQ ID NO:3}$$

wherein

Y1 is Gly, PEG3, Sarc, Lys, Glu, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent;

Y2 is Pro, Ala, Cys, Gly or absent;

Y3 is Arg, Lys, Pro, Gly, His, Ala, Trp or absent;

5 Y4 is Ser, Arg, Gly, Trp, Ala, His, Glu, Tyr or absent;

Y5 is Lys, Met, Ser, Arg, Ala or absent;

Y6 is Gly, Sarc, Glu, Lys, Arg, Ser, Lys, Ile, Ala, Pro, Val or absent;

Y7 is Trp, Lys, Gly, Ala Ile, Val or absent;

Y8 is Val, Trp, His, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent;

10 Y9 is Val, Asp, Asn, Cys, Tyr or absent;

Y10 is Cys, Met, Lys, Arg, Tyr or absent;

Y11 is Arg, Met, Cys, Lys or absent; and

Y12 is Arg, Lys, Ala or absent.

15 [0017] In one alternative embodiment, the present disclosure provides a hepcidin analogue peptide of formula Ia, wherein X5 is Pro, bhPro, Val, Glu, Sarc, Gly, or any N-methylated amino acid.

[0018] In one embodiment, the disclosure provides peptides, which may be isolated and/or purified, comprising, consisting essentially of, or consisting of formula I, wherein X is a peptide sequence having the formula Ib:

20 X1-X2-X3-X4-X5-X6-X7-X8-X9-X10 (Ib) SEQ ID NO:18

[0019] wherein

X1 is Asp, Glu, Ida, pGlu, bhAsp, D-Asp or absent;

X2 is Thr, Ser, Lys, Glu, Pro, Ala or absent;

X3 is His, Ala, or Glu;

25 X4 is Phe, Ile or Dpa;

X5 is Pro, bhPro, Sarc or Gly;

X6 is Cys;

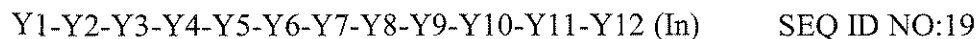
X7 is absent or any amino acid except Ile, Cys or (D)-Cys;

X8 is absent or any amino acid except Cys or (D)-Cys;

30 X9 is Phe, Ile, Tyr, bhPhe or D-Phe or absent; and

X10 is Lys, Phe or absent; and

[0020] wherein Y is absent or present, provided that if Y is present, Y is a peptide having the formula In:



5 [0021] wherein

Y1 is Gly, PEG3, Sarc, Lys, Glu, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent;

Y2 is Pro, Ala, Gly or absent;

Y3 is Arg, Lys, Pro, Gly, His, Ala, or absent;

Y4 is Ser, Arg, Glu or absent;

10 Y5 is Lys, Ser, Met, Arg, Ala or absent;

Y6 is Gly, Sarc, Glu, Leu, Phe, His or absent;

Y7 is Trp, N-Methyl Trp, Lys, Thr, His, Gly, Ala, Ile, Val or absent;

Y8 is Val, Trp, Ala, Asn, Glu or absent;

Y9 is Val, Ala, Asn, Asp, Cys or absent;

15 Y10 is Cys, (D)Cys, Glu or absent;

Y11 is Tyr, Met or absent; and

Y12 is Trp or absent.

[0022] In related embodiments, the disclosure provides peptides, which may be isolated and/or purified, comprising, consisting essentially of, or consisting of, the following
20 structural formula II:



[0023] or a pharmaceutically acceptable salt or solvate thereof,

[0024] wherein R^1 is hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the
25 foregoing;

[0025] R^2 is OH or NH_2 ;

[0026] X is a peptide sequence having the formula IIa:

Y7 is Trp, N-MethylTrp, Lys, Thr, His, Gly, Ala, Ile, Val or absent;

Y8 is Val, Trp, Ala, Asn, Glu or absent;

Y9 is Cys;

Y10 is Met or absent;

5 Y11 is Tyr, Met, or absent; and

Y12 is Trp or absent.

[0030] In certain embodiments, X6 in formula IIa is Cys.

[0031] In certain alternative embodiments, X7 in formula IIa is Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa or absent.

10 [0032] In certain embodiments, Y10 is absent.

[0033] In certain embodiments, Y11 is absent.

[0034] In certain embodiments, Y12 is absent.

[0034a] In one aspect, there is provided a hepcidin analogue having the structure of Formula II:

15
$$R^1-X-Y-R^2 \quad (II) \quad \text{SEQ ID NO:4}$$

or a pharmaceutically acceptable salt or solvate thereof,

wherein R^1 is hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing; R^2 is OH or NH_2 ;

20 X is a peptide sequence having the formula IIa:

$X1-X2-X3-X4-X5-X6-X7-X8-X9-X10$ (IIa) SEQ ID NO:5 SEQ ID NO:5

wherein

X1 is Asp, Glu or Ida;

X2 is Thr, Ser or absent;

25 X3 is His;

X4 is Phe or Dpa;

X5 is Pro, bhPro, Sarc or Gly;

X6 is Cys or (D)-Cys;

X7 is Arg, Glu, Phe, Gln, Leu, Val, Lys, Ile, Ala, Ser, Dapa or absent;

30 X8 is Ile, Arg, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent;

X9 is Phe, Tyr, bhPhe, D-Phe or absent; and

X10 is Lys, Phe or absent; and

wherein Y is absent or present, provided that if Y is present, Y is a peptide having the formula II_m:

5 Y1-Y2-Y3-Y4-Y5-Y6-Y7-Y8-Y9-Y10-Y11-Y12 (II_m) SEQ ID NO:602

wherein

Y1 is Gly, Sarc, Lys, Glu or absent;

Y2 is Pro, Ala, Gly or absent;

Y3 is Arg, Lys, Pro, Gly, His, Ala or absent;

10 Y4 is Ser, Arg, Glu or absent;

Y5 is Lys, Ser, Met, Arg, Ala or absent;

Y6 is Gly, Sarc, Glu, Leu, Phe, His or absent;

Y7 is Trp, NMe-Trp, Lys, Thr, His, Gly, Ala Ile, Val or absent;

Y8 is Val, Trp, Ala, Asn, Glu or absent;

15 Y9 is Cys;

Y10 is absent;

Y11 is absent; and

Y12 is absent.

20 **[0035]** In other related embodiments, the disclosure provides peptide homo- or heterodimers, which may be isolated and/or purified, comprising two hepcidin analogues, each hepcidin analogue comprising, consisting essentially of, or consisting of the structure of Formula I, the structure of Formula II, the structure of Formula III, the structure of Formula IV, the structure of Formula V, the structure of Formula VI, the structure of Formula VII, the structure of Formula VIII, the Structure of Formula IX, the structure of Formula X, or a
25 sequence or structure shown in any one of Tables 2-4, 6-10, 12, 14, or 15, provided that when the dimer comprises a hepcidin analogue having the structure of Formula III, Formula IV, Formula V, or Formula VI, the two hepcidin analogues are linked via a lysine linker.

30 **[0035a]** In one aspect, there is provided a dimer comprising two hepcidin analogues, each hepcidin analogue having the structure of Formula I, the structure of Formula II, the structure of Formula III, the structure of Formula IV, the structure of Formula V, the structure of Formula VI, or a sequence or structure shown in any one of Tables 2-4 and 6-8, or 10-12, provided that when the dimer comprises a hepcidin analogue having the structure of Formula III, Formula IV, Formula V, or Formula VI, the two hepcidin analogues are linked via a lysine linker.

35 **[0036]** In certain embodiments, a hepcidin analogue dimer of the present disclosure is dimerized by more than one means. In particular embodiments, a hepcidin analogue dimer of the present disclosure is dimerized by at least one intermolecular disulfide bridge and at least one linker moiety (e.g., an IDA linker, such as an IDA-Palm). In particular embodiments, a hepcidin analogue dimer of the present disclosure is dimerized by at least one intermolecular
40 disulfide bridge and at least one linker moiety (e.g., an IDA linker, such as an IDA-Palm), wherein the linker moiety is attached to a lysine residue in each of the peptide monomers.

Y2 is Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe or D-Phe or absent; and

Y3 is Lys, Phe or absent.

5 [0075] In one embodiment, the present disclosure provides peptide homo- or heterodimers, which may be isolated and/or purified, comprising two hepcidin analogues, each hepcidin analogue comprising, consisting essentially of, or consisting of the structure of Formula I or the structure of Formula II, wherein the two hepcidin analogues are linked via an Ida linker (e.g., an IDA-Palm linker), wherein the Ida linker is attached to a lysine (e.g., via a lysine sidechain) in each of the two hepcidin analogues. In one such embodiment, the dimer is a homodimer, and in another embodiment, the dimer is a heterodimer.

10 [0076] In one aspect, there is provided a polynucleotide comprising a sequence encoding a hepcidin analogue described herein or a hepcidin analogue of a dimer described herein.

[0077] In another aspect, there is provided a vector comprising a polynucleotide described herein.

15 [0078] In a further aspect, there is provided a pharmaceutical composition comprising a hepcidin analogue described herein or a dimer described herein, and a pharmaceutically acceptable carrier, excipient or vehicle.

20 [0079] In yet a further aspect, there is provided a method of binding a ferroportin or inducing ferroportin internalization and degradation, comprising contacting the ferroportin with at least one hepcidin analogue described herein, dimer described herein, or composition described herein.

[0079a] In one aspect, there is provided use of at least one hepcidin analogue described herein, dimer described herein, or composition described herein, in the manufacture of a medicament for treating a disease of iron metabolism in a subject.

25 [0080] In further related embodiments, the present disclosure includes a method for treating a disease of iron metabolism in a subject comprising providing to the subject an effective amount of at least one peptide or hepcidin analogue described herein.

[0081] In another aspect, there is provided a device comprising a hepcidin analogue described herein, dimer described herein, or composition described herein, for delivery of the hepcidin analogue, dimer or composition to a subject.

30 [0082] In yet another aspect, there is provided a kit comprising at least one hepcidin analogue described herein, dimer described herein, or composition described herein, packaged with a reagent, a device, or an instructional material, or a combination thereof.

Peptide Dimer Hepcidin Analogues

[00194] In certain embodiments, the present invention includes dimers of the monomer hepcidin analogues described herein, including dimers comprising any of the monomer peptides sequences or structures set forth in Tables 2-4, and certain dimers of sequences or structures set forth in Tables 6-10, 12, 14, and 15. In particular embodiments, the invention includes dimers of any of the monomer peptide sequences or structure set forth in Table 11 or 13. These dimers fall within the scope of the general term “hepcidin analogues” as used herein. The term “dimers,” as in peptide dimers, refers to compounds in which two peptide monomer subunits are linked. A peptide dimer of the present invention may comprise two identical monomer subunits, resulting in a homodimer, or two non-identical monomer subunits, resulting in a heterodimer. A cysteine dimer comprises two peptide monomer subunits linked through a disulfide bond between a cysteine residue in one monomer subunit and a cysteine residue in the other monomer subunit.

[00195] In particular embodiments, a peptide dimer hepcidin analogue comprises one or more, e.g., two, peptide monomer subunits shown in Table 4 or described in US Patent No. 8,435,941, which is herein incorporated by reference in its entirety.

Table 4. Illustrative peptide monomer subunits

SEQ ID NO	Sequence
376	DTHFPICIFC
377	FPIC
378	HFPIC
379	HFPICI
380	HFPICIF
381	DTHFPIC
589	DTHFPICI
382	DTHFPICIF
383	DTHFPICIFC
384	DTHAPICIF
385	DTHAPI-[C-StBu]-IF
386	DTHAPI-[C-tBu]-IF
387	DTHFPICIF
388	DTHFPISIF
389	DTHFPI-[(D)-Cys]-IF
390	DTHFPI-[homoCys]-IF
391	DTHFPI-[Pen]-IF
392	DTHFPI-[(D)-Pen]-IF
393	DTHFPI-[Dapa(AcBr)]-IF
394	CDTHFPICIF
395	DTHFPICIF-NHCH ₂ CH ₂ S

396	CHFPICIF
397	HFPICIF-NHCH ₂ CH ₂ S
398	D-[Tle]-H-[Phg]-[Oic]-[Chg]-C-[Chg]-F
399	D-[Tle]-HP-[Oic]-[Chg]-C-[Chg]-F
400	[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]
401	[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]
402	Chenodeoxycholate-(PEG11)-[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]
403	Ursodeoxycholate-(PEG11)-[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]
404 and 600	F-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]- (Peg11)-GYIPEAPRDGQAYVRKDGWVLLSTFL
405	F-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]- [GP-(Hyp)] ₁₀
406	Palmitoyl-(PEG11)-[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]- [(D)His]-[(D)Thr]-[(D)Asp]
407	2(Palmitoyl)-[Dapa]-(Peg11)-[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]- [(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]
408	DTH-[bhPhe]-PIICIF
409	DTH-[Dpa]-PICI
410	DTH-[Bip]-PICIF
411	DTH[1-Nal]-PICIF
412	DTH-[bhDpa]-PICIF
413	DTHFP-ICI-bhPhe
414	DTHFPICI-[Dpa]
415	DTHFPICI-[Bip]
416	DTHFPICI-[1-Nal]
417	DTHFPICI-[bhDpa]
418	DTH-[Dpa]-PICI-[Dpa]
419	D-[Dpa]-PICIF
420	D-[Dpa]-PICI-[Dpa]
421	DTH-[Dpa]-P-[(D)Arg]-CR-[Dpa]
422	DTH-[Dpa]-P-[(D)Arg]-C-[(D)Arg]-[Dpa]
423	DTH-[Dpa]-[Oic]-ICIF
424	DTH-[Dpa]-[Oic]-ICI-[Dpa]
425	DTH-[Dpa]-PCCC-[Dpa]
426	DTHFPICIF-[(D)Pro]-PK
427	DTHFPICIF-[(D)Pro]-PR
428	DTHFPICIF-[bhPro]-PK
429	DTHFPICIF-[bhPro]-PR
430	DTHFPICIF-[(D)Pro]-[bhPro]-K
431	DTHFPICIF-[(D)Pro]-[bhPro]-R
432	DTHFPICI-[bhPhe]-[(D)Pro]-PK
433	DTHFPICI-[bhPhe]-[(D)Pro]-PR
434	DTHFPICI-[bhPhe]-[(D)Pro]-[bhPro]-K
435	DTHFPICI-[bhPhe]-[(D)Pro]-[bhPro]-R
436	C-[Inp]-[(D)Dpa]-[Amc]-R-[Amc]-[Inp]-[Dpa]-Cysteamide
437	CP-[(D)Dpa]-[Amc]-R-[Amc]-[Inp]-[Dpa]-Cysteamide
438	C-[(D)Pro]-[(D)Dpa]-[Amc]-R-[Amc]-[Inp]-[Dpa]-Cysteamide
439	CG-[(D)Dpa]-[Amc]-R-[Amc]-[Inp]-[Dpa]-Cysteamide

(e.g., at its N-terminus, C-terminus, or internally via a side chain, e.g., a lysine side chain), or to an Lk linker.

[00224] In certain embodiments, Z is a palmyltyl moiety, a PEG moiety, or a lipidic moiety.

5 [00225] In certain embodiments, Lk links the two monomer subunits via an amino acid residue in X_n and/or an amino acid residue in Y_n.

[00226] In certain alternative embodiments, R₁, R₂, R₃, and R₄ are selected from a bond, -NH₂ and -OH, hydrogen, a C₁-C₆ alkyl, a C₆-C₁₂ aryl, a C₆-C₁₂ aryl C₁-C₆ alkyl, and a C₁-C₂₀ alkanoyl, and including PEGylated versions (e.g. PEG₃ to PEG₁₁), alone or as spacers of any of the foregoing.

10 [00227] In certain embodiments, Lk links the two monomer subunits via R₃ and/or R₄.

[00228] In certain embodiments, Lk links the monomer subunits via R₁ and/or R₂.

[00229] In certain embodiments, Lk links the monomer subunits via any one of R₁, X_n or R₃ and any one of R₂, Y_n and R₄.

15 [00230] In certain embodiments of Formula VIII, the linker is Lys or Phe. In particular embodiments, the linker is Lys.

[00231] In certain embodiments of Formula VIII, the two X peptides are linked via a disulfide bond.

20 [00232] In some embodiments, the present invention provides a hepcidin analogue monomer, or a homodimer or heterodimer thereof, comprising a peptide that comprises, consists of, or consists essentially of a sequence DTX₁FPC (SEQ ID NO: 590), wherein X₁ is any amino acid. In one embodiment, the present invention provides a peptide that comprises, consists of, or consists essentially of a sequence DTX₁FPCX₂X₃F (SEQ ID NO: 591), wherein X₁ is any amino acid, X₂ is any amino acid, and X₃ is any amino acid or it is absent. In one such embodiment, X₂ is any amino acid except for Cys. In one embodiment, X₁, X₂, and/or X₃ is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in
25
30 either one of the above formulae) to a Cys in the second monomer.

[00233] In some embodiments, the present invention provides a hepcidin analogue monomer, or a homodimer or heterodimer thereof, comprising a peptide that comprises, consists of, or consists essentially of a sequence $X_1X_2X_3FX_4CY_1X_5F$ (SEQ ID NO: 592), wherein any of X_1 , X_2 , and X_3 are absent or any amino acid, X_4 and X_5 are any amino acid, and Y_1 is any amino acid except for D-Cys, D-Ser, D-Ala, Cys(S-tBut), homoC, Pen, (D)Pen, Dap(AcBr), Inp, or D-His. In one such embodiment, Y_1 is any lipidic amino acid. In particular embodiments, Y_1 is selected from Val, Ile, and Leu. In one embodiment, Y_1 is Ile. In one embodiment, X_5 is Lys. In one embodiment, any of X_1 , X_2 , X_3 , X_4 , X_5 , and/or Y_1 is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in either one of the above formulae) to a Cys in the second monomer.

[00234] In some embodiments, the present invention provides a hepcidin analogue monomer, or a homodimer or heterodimer thereof, comprising a peptide that comprises, consists of, or consists essentially of a sequence $DTX_1FX_2CY_1X_3F$ (SEQ ID NO: 593), wherein X_1 is any amino acid, Y_1 is any amino acid except for D-Cys, D-Ser, D-Ala, Cys(S-tBut), homoC, Pen, (D)Pen, Dap(AcBr), Inp, or D-His, and X_2 is any amino acid or it is absent. In one such embodiment, Y_1 is any amino acid except for Cys. In one such embodiment, Y_1 is any lipidic amino acid. In particular embodiments, Y_1 is selected from Val, Ile, and Leu. In one embodiment, Y_1 is Ile. In one embodiment, X_1 , X_2 (if not absent), and/or Y_1 is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in either one of the above formulae) to a Cys in the second monomer.

[00235] In some embodiments, the present invention provides a hepcidin analogue homodimer or heterodimer comprising a hepcidin analogue monomer peptide that comprises, consists of, or consists essentially of a sequence DTX_1FPX_2C (SEQ ID NO: 594), wherein X_1 is any amino acid. In one embodiment, the present invention provides a hepcidin analogue homodimer or heterodimer comprising a hepcidin analogue monomer peptide that comprises, consists of, or consists essentially of a sequence $DTX_1FPX_2CX_3F$ (SEQ ID NO: 595), wherein X_1 is any amino acid, X_2 is any amino

acid, and X_3 is any amino acid or it is absent. In one such embodiment, X_2 is any amino acid except for Cys. In one embodiment, X_1 , X_2 , and/or X_3 is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin
5 analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in either one of the above formulae) to a Cys in the second monomer.

[00236] In some embodiments, the present invention provides a hepcidin analogue monomer, or a homodimer or heterodimer thereof, comprising a peptide that comprises, consists of, or
10 consists essentially of a sequence $X_1X_1X_1FX_2X_2CY_1F$ (SEQ ID NO: 596) wherein X_1 is absent or it is any amino acid, X_2 is any amino acid, and Y_1 is any amino acid. In one such embodiment, Y is any natural amino acid. In particular embodiments, Y_1 is selected from Arg, Val, Ile, and Leu. In one embodiment, Y_1 is Ile. In one embodiment, X_1 , X_2 , and/or Y_1
15 is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in
20 either one of the above formulae) to a Cys in the second monomer.

[00237] In some embodiments, the present invention provides a hepcidin analogue monomer, or a homodimer or heterodimer thereof, comprising a peptide that comprises, consists of, or consists essentially of a sequence $DTX_1FX_2X_3CY_1F$ (SEQ ID NO: 597), wherein X_1 is any amino acid, X_2 is any amino acid or it is absent, X_3 is any amino acid, and Y_1 is any amino
25 acid. In one such embodiment, Y_1 is any lipidic amino acid. In particular embodiments, Y_1 is selected from Val, Ile, and Leu. In one embodiment, Y_1 is Ile. In one embodiment, X_1 , X_2 (if not absent), and/or Y_1 is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second
30 monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in either one of the above formulae) to a Cys in the second monomer.

[00238] In some embodiments, the present invention provides a homodimer or heterodimer of one or more hepcidin analogue monomer that comprises, consists of, or consists essentially of a sequence $X_1X_1X_1FX_2X_2CX_3F$ (SEQ ID NO: 598) wherein X_1 is absent or it is any amino acid, X_2 is any amino acid, and X_3 is any amino acid. In one such embodiment, X_3 is any natural amino acid. In particular embodiments, X_3 is selected from Arg, Val, Ile, and Leu. In one embodiment, X_3 is Ile. In one embodiment, X_1 , X_2 , and/or X_3 is an unnatural amino acid. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in either one of the above formulae) to a Cys in the second monomer.

In some embodiments, the present invention provides a homodimer or heterodimer of one or more hepcidin analogue monomer that comprises, consists of, or consists essentially of a sequence $DTX_1FX_2X_3CX_4F$ (SEQ ID NO: 599), wherein X_1 is any amino acid, X_2 is any amino acid or it is absent, X_3 is any amino acid, and X_4 is any amino acid. In one such embodiment, X_4 is any amino acid except for Cys. In one such embodiment, X_4 is any lipidic amino acid. In particular embodiments, X_4 is selected from Val, Ile, and Leu. In one embodiment, X_4 is Ile. In one embodiment, X_1 , X_2 (if not absent), and/or X_4 is an unnatural amino acid. In one embodiment, Cys is linked through a disulphide forming a dimer. In some embodiments, a dimer comprising such a hepcidin analogue monomer comprises a linker (e.g., a lysine linker). In some embodiments, such a dimer comprises a first hepcidin analogue monomer and a second monomer (which monomers are optionally identical in sequence), and the dimer further comprises at least one intermolecular disulfide bridge linking a Cys in the first monomer (e.g., the Cys shown in either one of the above formulae) to a Cys in the second monomer.

[00239] In certain embodiments, a peptide dimer (e.g., a hepcidin analogue or inhibitor) of the present invention comprises two peptide monomer subunits connected via one or more linker moieties or intermolecular linkages (e.g., a cysteine disulfide bridge), wherein each peptide monomer subunit comprises a sequence shown in any of Tables 2-4 or Tables 11-15. In certain embodiments, the peptide dimer is a homodimer, and in other embodiments, the peptide dimer is a heterodimer. In some embodiments, a linker moiety or intermolecular linkage that dimerizes two monomers is bound to any of the N-terminus, the C-terminus, or an internal amino acid (e.g., a lysine sidechain) of one or more of the monomer peptides.

Y4 is His, Trp or Tyr;

Y6 is Ser, Gly or Pro;

Y7 is Ile, Gly or Lys;

Y8 is Gly, Met or absent;

5 Y10 is Tyr or Cys;

Y11 is Arg, Lys, Met or Ala;

Y12 is Arg or Ala;

Y13 is Cys or Val or absent;

Y14 is Cys, Lys, Pro, Arg, Thr or absent; and

10 Y15 is Arg, Thr or absent.

[00299] In some embodiments, Y is a peptide sequence having the formula (IIIq)

Val-Cys-Y3-His-Arg-Y6-Y7-Y8-Cys-Tyr-Arg-Y12-Y13-Y14-Y15 (IIIq) SEQ ID NO: 603

[00300] wherein

Y3 is Gly or absent;

15 Y6 is Ser or Pro;

Y7 is Ile or Lys;

Y8 is Gly or absent;

Y12 is Arg or Ala;

Y13 is Cys, Val or absent;

20 Y14 is Cys, Arg, Thr or absent; and

Y15 is Arg or absent.

[00301] In some embodiments, Y is a peptide sequence having the formula (IIIr)

Y14 is Cys, Lys, Pro, Arg, Thr or absent; and

Y15 is Arg, Thr or absent.

[00341] In some embodiments of the peptide compound of formula IV, Y is a peptide sequence having the formula (IVq)

5 Val-Cys-Y3-His-Arg-Y6-Y7-Y8-Cys-Tyr-Arg-Y12-Y13-Y14-Y15 (IVq) SEQ ID NO: 604

[00342] wherein

Y3 is Gly or absent;

Y6 is Ser or Pro;

Y7 is Ile or Lys;

10 Y8 is Gly or absent;

Y12 is Arg or Ala;

Y13 is Cys, Val or absent;

Y14 is Cys, Arg, Thr or absent; and

Y15 is Arg or absent.

15 [00343] In some embodiments of the peptide compound of formula IV, Y is a peptide sequence having the formula (IVr)

Y1-Pro-Y3-Ser-Y5-Y6-Y7-Y8-Cys-Y10 (IVr) SEQ ID NO: 605

[00344] wherein

Y1 is Gly, Glu, Val, or Lys;

20 Y3 is Arg or Lys;

Y5 is Arg or Lys;

Y6 is Gly, Ser, Lys, Ile or Arg;

Y7 is Trp or absent;

[00345] Y8 is Val, Thr, Asp, Glu or absent; and

[00346] Y10 is Lys or absent.

[00347] In some embodiments of the peptide compound of formula IV, Y is a peptide sequence having the formula (IVs)

5 Y1-Pro-Y3-Ser-Y5-Y6-Y7-Y8-Cys-Y10 (IVs) SEQ ID NO: 606

[00348] wherein

Y1 is Glu or Lys;

Y3 is Arg or Lys;

Y5 is Arg or Lys;

10 Y6 is Gly, Ser, Lys, Ile or Arg;

Y7 is Trp or absent;

Y8 is Val or absent; and

Y10 is Lys or absent.

[00349] In some embodiments, the peptide of formula IV comprises at least three, at least
15 four, at least five, at least six, at least seven, at least eight, at least nine, at least ten, at least
eleven, at least twelve, at least thirteen, at least fourteen or at least fifteen Y residues in Y.

[00350] In some embodiments, Y1 to Y3 are present and Y4 to Y15 are absent.

[00351] In some embodiments, Y1 to Y11 are present and Y12 to Y15 are absent.

[00352] In some embodiments, Y1 to Y10 are present and Y11 to Y15 are absent.

20 [00353] In some embodiments, Y8 and Y15 are absent.

[00354] In some embodiments, Y3 and Y15 are absent

[00355] In some embodiments, Y3, Y14 and Y15 are absent.

[00356] In some embodiment Y5 is absent.

286	310	Hy-DTHFPCIEF-NH ₂	>1 μ M
287	309	Hy-DTHFPCIEF-NH ₂	>1 μ M
288	311	Isovaleric acid-DTHFPCIEF-NH ₂	16 nM
289	312	Isovaleric acid-DTHFPAIEF-NH ₂	Inactive
290	313	Isovaleric acid-DTHFPSIEF-NH ₂	Inactive
291	314	Isovaleric acid-DTHFPCIKF-NH ₂	7 nM
293	316	Hy-DTHFPCIF-NH ₂	52% at 1 μ M
297	320	Hy-DTHFPCIKFF-NH ₂	64% at 1 μ M
298	321	Hy-YTHFPCIEF-NH ₂	Not Tested
299	322	Hy-LTHFPCIEF-NH ₂	64% at 1 μ M
300	323	Hy-ETHFPCIEF-NH ₂	77% at 1 μ M
301	324	Hy-DRHFPCIEF-NH ₂	Not Tested
302	325	Hy-DTKFPCIEF-NH ₂	60% at 1 μ M
303	326	Hy-DTHFECIEF-NH ₂	Not Tested
304	327	Hy-DTHFPCIEK-NH ₂	55% at 1 μ M
305	328	Hy-DTHFPCIEH-NH ₂	62% at 1 μ M
306	329	Hy-DTHFPCIEF-NH ₂	Not Tested
307	330	Hy-DTHFPCIVF-NH ₂	75% at 1 μ M
308	331	Hy-DTHFPCILF-NH ₂	89% at 1 μ M
309	332	Hy-DTHFPCILK-NH ₂	55% at 1 μ M
310	333	Hy-DTHFPCIEK-NH ₂	0% at 1 μ M
355	369	Isovaleric acid-DTHFPCIKFEPKSKECK-NH ₂	48
356	370	Isovaleric acid-DTHFPCIKFEPHSKECK-NH ₂	181

	376	DTHFPICIFC	
	377	FPIC	
	378	HFPIC	
	379	HFPICI	
	380	HFPICIF	
	381	DTHFPIC	
	589	DTHFPICI	
	382	DTHFPICIF	
	383	DTHFPICIFC	
	384	DTHAPICIF	
	385	DTHAPI-[C-StBu]-IF	
	386	DTHAPI-[C-tBu]-IF	
	387	DTHFPICIF	
	388	DTHFPISIF	
	389	DTHFPI-[(D)-Cys]-IF	
	390	DTHFPI-[homoCys]-IF	
	391	DTHFPI-[Pen]-IF	
	392	DTHFPI-[(D)-Pen]-IF	
	393	DTHFPI-[Dapa(AcBr)]-IF	
	394	CDTHFPICIF	
	395	DTHFPICIF-NHCH ₂ CH ₂ S	
	396	CHFPCIF	
	397	HFPICIF-NHCH ₂ CH ₂ S	

	398	D-[Tle]-H-[Phg]-[Oic]-[Chg]-C-[Chg]-F	
	399	D-[Tle]-HP-[Oic]-[Chg]-C-[Chg]-F	
	400	[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)pro]-[(D)Phe]- [(D)His]-[(D)Thr]-[(D)Asp]	
	401	[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]	
	402	Chenodeoxycholate-(Peg11)-[(D)Phe]-[(D)Ile]-[(D)Cys]- [(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]	
	403	Ursodeoxycholate-(Peg11)-[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]- [(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]	
	404 and 600	F-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]- [(D)Thr]-[(D)Asp]-(Peg11)- GYIPEAPRDGQAYVRKDGEWVLLSTFL	
	405	F-[(D)Ile]-[(D)Cys]-[(D)Ile]-[(D)pro]-[(D)Phe]-[(D)His]- [(D)Thr]-[(D)Asp]-[(GP-(Hyp)) ₁₀	
	406	Palmitoyl-(Peg11)-[(D)Phe]-[(D)Ile]-[(D)Cys]-[(D)Ile]- [(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]	
	407	2(Palmitoyl)-[Dapa]-(Peg11)-[(D)Phe]-[(D)Ile]-[(D)Cys]- [(D)Ile]-[(D)Pro]-[(D)Phe]-[(D)His]-[(D)Thr]-[(D)Asp]	
	408	DTH-[bhPhe]-PIICIF	
	409	DTH-[Dpa]-PICI.	
	410	DTH-[Bip]-PICIF	
	411	DTH[1-Nal]-PICIF	
	412	DTH-[bhDpa]-PICIF	
	413	DTHFP-ICI-bhPhe	
	414	DTHFPICI-[Dpa]	
	415	DTHFPICI-[Bip]	
	416	DTHFPICI-[1-Nal]	
	417	DTHFPICI-[bhDpa]	
	418	DTH-[Dpa]-PICI-[Dpa]	
	419	D-[Dpa]-PICIF	
	420	D-[Dpa]-PICI-[Dpa]	

63	Ac-DTHFPICIFGPRSKGWVCM-NH ₂	0.38	6	-
128	Isovaleric acid-DTHFPCIIFEPRSKGWVCK-NH ₂	0.68	-	2.22
31	Isovaleric acid-DTHFPCIIFGPRSKGWVC-NH ₂	0.13	4	0.94
557	Isovaleric acid-DTHFPCIIFGPRSKGVCK-NH ₂	0.27	-	1.17
138	Isovaleric acid-DTHFPCIIFGPRSKGCK-NH ₂	0.19	-	1.33
558	Isovaleric acid-DTHFPCIFGPRSKGWCK-NH ₂	0.21	-	0.99
144	Isovaleric acid-DTHFPCIKFGPRSKGWECK-NH ₂	0.38	-	1.19
38	Isovaleric acid-DTHFPCIIFGPRSKGWVCK-NH ₂	0.14	-	-
36	Isovaleric acid-DTHFPCIKFGPRSKGWVCK-NH ₂	0.14	-	0.57
37	Isovaleric acid-DTHFPCIQFGPRSKGWVCK-NH ₂	0.12	-	0.61
42	Isovaleric acid-DTHFPCIEFGPRSKGWVCK-NH ₂	0.15	-	0.74
172	Isovaleric acid-DTHFPCI-K(m-PEG8)-FGPRSKGWVCK-NH ₂	0.32	-	1.13
173	Isovaleric acid-DTHFPCIKF-K(m-PEG8)-PRSKGWVCK-NH ₂	0.42	-	1.35
175	Isovaleric acid-DTHFPCIKFGPRS-K(m-PEG8)-GWVCK-NH ₂	1.16	-	11.09
176	Isovaleric acid-DTHFPCIKFGPRSKGWVC-K(m-PEG8)-NH ₂	0.41	-	3.36
181	Isovaleric acid-DTHFPCI-K(Betaine)-FGPRSKGWVCK-NH ₂	0.14	-	1.22
559	(Isovaleric acid-DTHFPCIIF-NH ₂) ₂	18	-	>24
560	Isovaleric acid-DTHFPICIFGPRS-K(m-PEG8)-GWVC-NH ₂	1.62	-	15
561	Isovaleric acid-DTHFPICIFGPRS-K(m-PEG4)-GWVC-NH ₂	1.1	-	12
562	(Isovaleric acid-DTHFPCIIFGPRSRGWVCK) ₂ -DIG-NH ₂	0.59	-	9
563	Isovaleric acid-DTHFPICIFGPRSKG-[NMeTrp]-VC-NH ₂	0.07	-	0.4
564	Isovaleric acid-DTHFPICIF-[Sar]-PRSKG-[NMeTrp]-VC-NH ₂	0.24	-	1.36
565	Isovaleric acid-DTHFPICIF-[Sar]-PHSKG-[NMeTrp]-VC-NH ₂	11.3	-	>24
207	Isovaleric acid-DTHFPCIKFEPRSKGCK-NH ₂	2.12	-	8.06
218	Isovaleric acid-DTHFPCIKF-K(Palm)-PRSKGWVCK-NH ₂	24	-	>24
220	Isovaleric acid-DTHFPCIKFGPRS-K(Palm)-GWVCK-NH ₂	>24	-	>>24
223	Isovaleric acid-DTHFPCIKF-K(PEG3-Palm)-PRSKGWVCK-NH ₂	3.95	-	22.2
228	Hy-DTHFPCIKF-K(IVA)-PRSKGWVCK-NH ₂	0.19	-	0.31
233	Hy-DTHFPCIKF-K(PEG3-IVA)-PRSKGWVCK-NH ₂	0.35	-	0.58
491	Isovaleric acid-DTHFPCIIFEPRSKHWVCK-NH ₂	1.29	-	4.71

Table 13. Chemicals and equipment used

Drug Name	Cmpd. No.	SEQ ID No.	MW (g/mol)	Peptide Content Calculated %	Peptide Content Determined %	Purity %	Solvent
Isovaleric acid-DTHFPICIF GPRSKGW VC-NH ₂ (SEQ ID NO: 29)	2	29	2144.52	86.2	86.2	90	Na-Acetate buffer
RI-Hepcidin1-9		546	1091.3	82.7	82.7	94.2	Strong PBS

[00511] Initially, all compounds, including peptides analogues, are solubilized in acidic H₂O in pH=2.5 and to a concentration of 3 mg/ml API. Compounds are thereafter either dissolved in Na-Acetate buffer (50 mM Acetic Acid, 125 mM NaCl, pH 5.0) or strong PBS, (25 mM sodium phosphate, 125 mM NaCl, pH 7.4).

[00512] Male Sprague-Dawley rats weighing 200-250 g are used in the study. They are housed in groups for n=2 in a light-, temperature- and humidity-controlled room (12-hour light: 12-hour dark cycle, lights on/off at 0600/1800 hour; 23 degrees Celsius; 50% relative humidity). Humane endpoints are applied, according to OECD's 'Guidelines for Endpoints in Animal Study Proposals.' The animals are monitored daily. In case of significantly affected condition (based on signs such as weight loss > 30% (obese animals); abnormal posture; rough hair coat; exudate around eyes and/or nose; skin lesions; abnormal breathing; difficulty with ambulation; abnormal food or water intake; or self-mutilation), or other conditions causing significant pain or distress, the animals are euthanized immediately.

[00513] Iron content in plasma/serum is measured for iron content using a colorimetric assay on the Cobas c 111 according to instructions from the manufacturer of the assay (assay: IRON2: ACN 661).

[00514] The data obtained from the cobas Iron2 analysis is presented as mean values +/- SEM.

[00515] Dosing of peptide analogues of the present invention is expected to result in a decrease in serum iron level that is comparable to that observed after injection of the positive control Retro Inverse mini Hepcidin (RI-Mini-Hepcidin).

EXAMPLE 5

IN VIVO VALIDATION OF PEPTIDE ANALOGUES

[00516] Peptide analogues of the present invention were tested for *in vivo* activity, as described in the previous Example, with the following changes. Instead of rats, mice (C57-BL6) were tested. Peptides or vehicle controls were administered to the mice (n=8/group) with the compounds of the present invention dosed at 3000 nmol / kg, and a hepcidin control administered via subcutaneous injection at 1000 nmol/kg. Peptides tested are shown in Table 14 with internalization/degradation assay potency values.

Table 14. Potency of illustrative hepcidin analogues

Compound number	SEQ ID NO:	Sequence	Potency EC50 (nM)
Hepcidin	335	Hy-DTHFPICIFCCGCCHRSKCGMCCKT-OH	34
Cmpd1	207	Isovaleric acid-DTHFPICIKFEPRSKG__CK-NH ₂	23
Cmpd2	36	Isovaleric acid - DTHFPICIKFGPRSKGWVCK-NH ₂	35
Cmpd3	601	Isovaleric acid – DTHFPICIKFGPRSKGWVCK-[(m-PEG8)]--NH ₂	17
Cmpd4	199	Isovaleric acid – DTHFPICIFGPRSK-[(m-PEG8)]-GWVC-NH ₂	6.4
Cmpd5	492	Isovaleric acid-DTHFPCHIFEPRSKKEWVCK-NH ₂	19
Cmpd6	490	Isovaleric acid-DTHFPCHIF-[Sarc]-PHSKG-[N-MeTrp]-VC-NH ₂	9

[00517] The primary goal of this experiment was to validate, in a mouse model, the activity of peptide analogues of the present invention. Serum iron levels were assessed as in the previous Example two hours after peptide or vehicle administration. A significant reduction in serum iron was observed in compound-treated animals as compared to the vehicle control. Furthermore, the max-dose responses of compounds of the present invention are expected to be similar to the max-dose response achieved with Hepcidin.

[00518] A similar experiment was performed with lower doses to assess the dose response of these compounds for inducing serum iron reduction. Methods were as described above in this Example, except for the following parameters: n = 4 mice / group, however n = 8 for the

3. The hepcidin analogue of claim 1, wherein the hepcidin analogue comprises an amino acid sequence or a structure shown in Table 2.

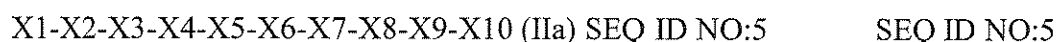
4. A hepcidin analogue having the structure of Formula II:



or a pharmaceutically acceptable salt or solvate thereof,

wherein R^1 is hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing; R^2 is OH or NH_2 ;

X is a peptide sequence having the formula IIa:



wherein

X1 is Asp, Glu or Ida;

X2 is Thr, Ser or absent;

X3 is His;

X4 is Phe or Dpa;

X5 is Pro, bhPro, Sarc or Gly;

X6 is Cys or (D)-Cys;

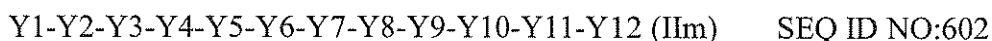
X7 is Arg, Glu, Phe, Gln, Leu, Val, Lys, Ile, Ala, Ser, Dapa or absent;

X8 is Ile, Arg, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent;

X9 is Phe, Tyr, bhPhe, D-Phe or absent; and

X10 is Lys, Phe or absent; and

wherein Y is absent or present, provided that if Y is present, Y is a peptide having the formula IIIm:



wherein

Y1 is Gly, Sarc, Lys, Glu or absent;

Y2 is Pro, Ala, Gly or absent;

Y3 is Arg, Lys, Pro, Gly, His, Ala or absent;

Y4 is Ser, Arg, Glu or absent;

Y5 is Lys, Ser, Met, Arg, Ala or absent;

Y6 is Gly, Sarc, Glu, Leu, Phe, His or absent;

Y7 is Trp, NMe-Trp, Lys, Thr, His, Gly, Ala, Ile, Val or absent;

Y8 is Val, Trp, Ala, Asn, Glu or absent;

18. The dimer of any one of claims 6-16, wherein the dimer is a heterodimer.
19. The hepcidin analogue of any one of claims 1-5 or the dimer of any one of claims 6-16, wherein two cysteine residues of one or more hepcidin analogue are linked by an *intramolecular disulfide bridge*.
20. The dimer of any one of claims 6-16, wherein the two hepcidin analogues are linked by a linker moiety selected from diethylene glycol linker, an iminodiacetic acid (IDA) linker, a β -Ala-iminodiaceticacid (β -Ala-IDA) linker, or a PEG linker, and wherein the dimer does not include a peptide analogue having a structure of Formula III, IV, V, or VI, or a sequence shown in any of compounds 1-361 in Table 12 or a sequence shown in Table 10.
21. A polynucleotide comprising a sequence encoding the hepcidin analogue of any one of claims 1-5 or a hepcidin analogue of the dimer of any one of claims 6-20.
22. A vector comprising the polynucleotide of claim 21.
23. A pharmaceutical composition comprising the hepcidin analogue of any one of claims 1-5 or the dimer of any one of claims 6-20, and a pharmaceutically acceptable carrier, excipient or vehicle.
24. A method of binding a ferroportin or inducing ferroportin internalization and degradation, comprising contacting the ferroportin with at least one hepcidin analogue of any one of claims 1-5, dimer of any one of claims 6-20, or composition of claim 23.
25. Use of at least one hepcidin analogue of any one of claims 1-5, dimer of any one of claims 6-20, or the composition of claim 23, in the manufacture of a medicament for treating a disease of iron metabolism in a subject.
26. The use of claim 25, wherein the pharmaceutical composition is provided

to the subject by an oral, intravenous, peritoneal, intradermal, subcutaneous, intramuscular, intrathecal, inhalation, vaporization, nebulization, sublingual, buccal, parenteral, rectal, vaginal, or topical route of administration.

27. The use of claim 25, wherein the disease of iron metabolism is an iron overload disease.

28. A device comprising the hepcidin analogue of any one of claims 1-5, the dimer of any one of claims 6-20, or the composition of claim 23, for delivery of the hepcidin analogue, dimer or composition to a subject.

29. A kit comprising at least one hepcidin analogue of any one of claims 1-5, dimer of any one of claims 6-20, or composition of claim 23, packaged with a reagent, a device, or an instructional material, or a combination thereof.

30. The hepcidin analogue of claim 4, wherein X6 is Cys.

31. The hepcidin analogue of claim 4, wherein X7 is Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa or absent.

32. The dimer of claim 6, comprising a monomer peptide having a sequence or structure shown in Table 14 or 15.

SEQUENCE LISTING

<110> PROTAGONIST THERAPEUTICS, INC.
 <120> HEPCIDIN AND MINI-HEPCIDIN ANALOGUES AND USES THEREOF
 <130> PRTH-005/01WO
 <140> PCT/US2015/038370
 <141> 2015-06-29
 <150> 62/018,382
 <151> 2014-06-27
 <160> 606
 <170> PatentIn version 3.5
 <210> 1
 <211> 22
 <212> PRT
 <213> Artificial Sequence
 <220>
 <223> Description of Artificial Sequence: Synthetic peptide
 <220>
 <223> N-term hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl, C1-C6 alkyl or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing
 <220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Ser, Glu, Ida, pGlu, bhAsp, D-Asp or absent
 <220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ser, Lys, Glu, Pro, Ala or absent
 <220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> His, Ala or Glu
 <220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe, Ile or Dpa
 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, bhPro, Val, Glu, Sarc or Gly
 <220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Cys or (D)-Cys
 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> absent or any amino acid except Ile, Cys or (D)-Cys
 <220>

<221> MOD_RES
 <222> (8)..(8)
 <223> absent or any amino acid except Cys or (D)-Cys

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, hPhe, D-Phe or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<220>
 <221> MOD_RES
 <222> (11)..(11)
 <223> Gly, Sarc, Lys, Glu, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

<220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Pro, Ala, Cys, Gly or absent

<220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Arg, Lys, Pro, Gly, His, Ala, Trp or absent

<220>
 <221> MOD_RES
 <222> (14)..(14)
 <223> Ser, Arg, Gly, Trp, Ala, His, Glu, Tyr or absent

<220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Lys, Met, Ser, Arg, Ala or absent

<220>
 <221> MOD_RES
 <222> (16)..(16)
 <223> Gly, Sarc, Glu, Lys, Arg, Ser, Lys, Ile, Ala, Pro, Val or absent

<220>
 <221> MOD_RES
 <222> (17)..(17)
 <223> Trp, Lys, Gly, Ala, Ile, Val or absent

<220>
 <221> MOD_RES
 <222> (18)..(18)
 <223> Val, Trp, His, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent

<220>
 <221> MOD_RES
 <222> (19)..(19)
 <223> Val, Asp, Asn, Cys, Tyr or absent

<220>
 <221> MOD_RES
 <222> (20)..(20)
 <223> Cys, Met, Lys, Arg, Tyr or absent

<220>
 <221> MOD_RES
 <222> (21)..(21)

<223> Arg, Met, Cys, Lys or absent

<220>

<221> MOD_RES

<222> (22)..(22)

<223> Arg, Lys, Ala or absent

<220>

<221> misc_feature

<222> (11)..(22)

<223> This region may or may not be present

<220>

<223> C-term -OH or -NH2

<400> 1

Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa
20

<210> 2

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (1)..(1)

<223> Asp, Ser, Glu, Ida, pGlu, bhAsp, D-Asp or absent

<220>

<221> MOD_RES

<222> (2)..(2)

<223> Thr, Ser, Lys, Glu, Pro, Ala or absent

<220>

<221> MOD_RES

<222> (3)..(3)

<223> His, Ala or Glu

<220>

<221> MOD_RES

<222> (4)..(4)

<223> Phe, Ile or Dpa

<220>

<221> MOD_RES

<222> (5)..(5)

<223> Pro, bhPro, val, Glu, Sarc or Gly

<220>

<221> MOD_RES

<222> (6)..(6)

<223> Cys or (D)-Cys

<220>

<221> MOD_RES

<222> (7)..(7)

<223> absent or any amino acid except Ile, Cys or (D)-Cys

<220>

<221> MOD_RES
 <222> (8)..(8)
 <223> absent or any amino acid except Cys or (D)-Cys

 <220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent

 <220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

 <400> 2
 Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa
 1 5 10

 <210> 3
 <211> 12
 <212> PRT
 <213> Artificial sequence

 <220>
 <223> Description of Artificial sequence: Synthetic peptide

 <220>
 <223> N-term may or may not include PEG3

 <220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Gly, Sarc, Lys, Glu, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

 <220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Pro, Ala, Cys, Gly or absent

 <220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> Arg, Lys, Pro, Gly, His, Ala, Trp or absent

 <220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Ser, Arg, Gly, Trp, Ala, His, Glu, Tyr or absent

 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Lys, Met, Ser, Arg, Ala or absent

 <220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Gly, Sarc, Glu, Lys, Arg, Ser, Lys, Ile, Ala, Pro, Val or absent

 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Trp, Lys, Gly, Ala, Ile, Val or absent

 <220>

<221> MOD_RES
 <222> (8)..(8)
 <223> Val, Trp, His, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or
 absent

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Val, Asp, Asn, Cys, Tyr or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Cys, Met, Lys, Arg, Tyr or absent

<220>
 <221> MOD_RES
 <222> (11)..(11)
 <223> Arg, Met, Cys, Lys or absent

<220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Arg, Lys, Ala or absent

<400> 3
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

<210> 4
 <211> 22
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide

<220>
 <223> N-term hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl,
 C1-C6 alkyl or a C1-C20 alkanoyl, and including PEGylated
 versions alone or as spacers of any of the foregoing

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu or Ida

<220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ser or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe or Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, bhPro, Sarc or Gly

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Cys or D-Cys

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Arg, Glu, Phe, Gln, Leu, Val, Lys, Ile, Ala, Ser,
 Dapa or absent

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Arg, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser,
 Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Tyr, bhPhe, D-Phe or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<220>
 <221> MOD_RES
 <222> (11)..(11)
 <223> Gly, Sarc, Lys, Glu or absent

<220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Pro, Ala, Gly or absent

<220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Arg, Lys, Pro, Gly, His, Ala or absent

<220>
 <221> MOD_RES
 <222> (14)..(14)
 <223> Ser, Arg, Glu or absent

<220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Lys, Ser, Met, Arg, Ala or absent

<220>
 <221> MOD_RES
 <222> (16)..(16)
 <223> Gly, Sarc, Glu, Leu, Phe, His or absent

<220>
 <221> MOD_RES
 <222> (17)..(17)
 <223> Trp, N-Methyl-Trp, Lys, Thr, His, Gly, Ala, Ile,
 Val or absent

<220>
 <221> MOD_RES
 <222> (18)..(18)
 <223> Val, Trp, Ala, Asn, Glu or absent

<220>
 <221> MOD_RES
 <222> (20)..(20)
 <223> May or may not be present

<220>
<221> MOD_RES
<222> (21)..(21)
<223> Tyr, Met or absent

<220>
<221> MOD_RES
<222> (22)..(22)
<223> May or may not be present

<220>
<221> misc_feature
<222> (11)..(22)
<223> This region may or may not be present

<220>
<223> C-term -OH or -NH2

<400> 4
Xaa Xaa His Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Cys Met Xaa Trp
20

<210> 5
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Asp, Glu or Ida

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Thr, Ser or absent

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe or Dpa

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro, bhPro, Sarc or Gly

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Cys or D-Cys

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Arg, Glu, Phe, Gln, Leu, Val, Lys, Ile, Ala, Ser, Dapa or absent

<220>

<221> MOD_RES
<222> (8)..(8)
<223> Ile, Arg, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser,
Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

<220>
<221> MOD_RES
<222> (9)..(9)
<223> Phe, Tyr, bhPhe, D-Phe or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys, Phe or absent

<400> 5
Xaa Xaa His Xaa Xaa Cys Xaa Xaa Xaa Xaa
1 5 10

<210> 6
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Gly, Sarc, Lys, Glu or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Pro, Ala, Gly or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Arg, Lys, Pro, Gly, His, Ala or absent

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Ser, Arg, Glu or absent

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Lys, Ser, Met, Arg, Ala or absent

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Gly, Sarc, Glu, Leu, Phe, His or absent

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Trp, N-Methyl-Trp, Lys, Thr, His, Gly, Ala, Ile, Val or absent

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Val, Trp, Ala, Asn, Glu or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (11)..(11)
<223> Tyr, Met or absent

<220>
<221> MOD_RES
<222> (12)..(12)
<223> May or may not be present

<400> 6
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Met Xaa Trp
1 5 10

<210> 7
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl, C1-C6 alkyl or a C1-C20 alkanoyl, and including PEGylated versions thereof, alone or as spacers of any of the foregoing

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Asp, Glu, Ala, Gly, Thr, Ida, pGlu, bhAsp, D-Asp, Tyr, Leu or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Thr, Ala, Aib, D-Thr, Arg or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> His, Lys, Ala or D-His

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe, Ala, Dpa or bhPhe

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro, Glu, Ser, Gly, Arg, Lys, Val, Ala, D-Pro, bhPro, Sarc, Abu or absent

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Ile, Cys, Arg, Leu, Lys, His, Glu, D-Ile, D-Arg, D-Cys, Val, Ser or Ala

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, Ile, Ala, Leu, Val, Ser, Phe, Dapa, D-Ile or D-Cys

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg or Dapa

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Tyr, Lys, Arg, bhPhe or D-Phe

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<220>
 <221> MOD_RES
 <222> (11)..(11)
 <223> Gly, Cys, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

<220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Pro, Ala, Cys, Gly or absent

<220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Arg, Lys, Pro, Gly, His, Ala, Trp or absent

<220>
 <221> MOD_RES
 <222> (14)..(14)
 <223> Ser, Arg, Gly, Trp, Ala, His, Tyr or absent

<220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Lys, Met, Arg, Ala or absent

<220>
 <221> MOD_RES
 <222> (16)..(16)
 <223> Gly, Ser, Lys, Ile, Arg, Ala, Pro, Val or absent

<220>
 <221> MOD_RES
 <222> (17)..(17)
 <223> Trp, Lys, Gly, Ala, Ile, Val or absent

<220>
 <221> MOD_RES
 <222> (18)..(18)
 <223> Val, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent

<220>
 <221> MOD_RES
 <222> (19)..(19)
 <223> Cys, Tyr or absent

<220>
 <221> MOD_RES

<222> (20)..(20)
 <223> Met, Lys, Arg, Tyr or absent

 <220>
 <221> MOD_RES
 <222> (21)..(21)
 <223> Arg, Met, Cys, Lys or absent

 <220>
 <221> MOD_RES
 <222> (22)..(22)
 <223> Arg, Lys, Ala or absent

 <220>
 <221> MOD_RES
 <222> (23)..(23)
 <223> Arg, Cys, Lys, Val or absent

 <220>
 <221> MOD_RES
 <222> (24)..(24)
 <223> Arg, Lys, Pro, Cys, Thr or absent

 <220>
 <221> MOD_RES
 <222> (25)..(25)
 <223> Thr, Arg or absent

 <220>
 <221> misc_feature
 <222> (11)..(25)
 <223> This region may or may not be present

 <220>
 <223> C-term -NH2 or -OH

 <400> 7
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 20 25

 <210> 8
 <211> 10
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic peptide

 <220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ala, Gly, Thr, Ida, pGlu, bhAsp, D-Asp, Tyr, Leu or absent

 <220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ala, Aib, D-Thr, Arg or absent

 <220>
 <221> MOD_RES
 <222> (3)..(3)

<223> His, Lys, Ala or D-His

<220>

<221> MOD_RES

<222> (4)..(4)

<223> Phe, Ala, Dpa or bhPhe

<220>

<221> MOD_RES

<222> (5)..(5)

<223> Pro, Glu, Ser, Gly, Arg, Lys, Val, Ala, D-Pro, bhPro, Sarc,
Abu or absent

<220>

<221> MOD_RES

<222> (6)..(6)

<223> Ile, Cys, Arg, Leu, Lys, His, Glu, D-Ile, D-Arg, D-Cys,
Val, Ser or Ala

<220>

<221> MOD_RES

<222> (7)..(7)

<223> Cys, Ile, Ala, Leu, Val, Ser, Phe, Dapa, D-Ile or D-Cys

<220>

<221> MOD_RES

<222> (8)..(8)

<223> Ile, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu,
Val, D-Ile, D-Lys, D-Arg or Dapa

<220>

<221> MOD_RES

<222> (9)..(9)

<223> Phe, Ala, Ile, Tyr, Lys, Arg, bhPhe or D-Phe

<220>

<221> MOD_RES

<222> (10)..(10)

<223> Lys, Phe or absent

<400> 8

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 9

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<220>

<221> MOD_RES

<222> (1)..(1)

<223> Gly, Cys, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

<220>

<221> MOD_RES

<222> (2)..(2)

<223> Pro, Ala, Cys, Gly or absent

<220>

<221> MOD_RES

<222> (3)..(3)

<223> Arg, Lys, Pro, Gly, His, Ala, Trp or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Ser, Arg, Gly, Trp, Ala, His, Tyr or absent

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Lys, Met, Arg, Ala or absent

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Gly, Ser, Lys, Ile, Arg, Ala, Pro, Val or absent

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Trp, Lys, Gly, Ala, Ile, Val or absent

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Val, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Cys, Tyr or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Met, Lys, Arg, Tyr or absent

<220>
 <221> MOD_RES
 <222> (11)..(11)
 <223> Arg, Met, Cys, Lys or absent

<220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Arg, Lys, Ala or absent

<220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Arg, Cys, Lys, Val or absent

<220>
 <221> MOD_RES
 <222> (14)..(14)
 <223> Arg, Lys, Pro, Cys, Thr or absent

<220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Thr, Arg or absent

<400> 9
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

<210> 10
 <211> 25

<212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic peptide

 <220>
 <223> N-term hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl, C1-C6 alkyl or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing

 <220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ala, Gly, Thr, Ida, pGlu, bhAsp, D-Asp, Tyr, Leu or absent

 <220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ala, Aib, D-Thr, Arg or absent

 <220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> His, Lys, Ala or D-His

 <220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe, Ala, Dpa, bhPhe or D-Phe

 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, Glu, Ser, Gly, Arg, Lys, Val, Ala, D-Pro, bhPro, Sarc, Abu or absent

 <220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Ile, Cys, Arg, Leu, Lys, His, Glu, D-Ile, D-Arg, D-Cys, Val, Ser or Ala

 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, Ile, Ala, Leu, Val, Ser, Phe, Dapa, D-Ile or D-Cys

 <220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg or Dapa

 <220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Tyr, Lys, Arg, bhPhe or D-Phe

 <220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

 <220>
 <221> MOD_RES

<222> (11)..(11)
 <223> Gly, Cys, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

 <220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Pro, Ala, Cys, Gly or absent

 <220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Arg, Lys, Pro, Gly, His, Ala, Trp or absent

 <220>
 <221> MOD_RES
 <222> (14)..(14)
 <223> Ser, Arg, Gly, Trp, Ala, His, Tyr or absent

 <220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Lys, Met, Arg, Ala or absent

 <220>
 <221> MOD_RES
 <222> (16)..(16)
 <223> Gly, Ser, Lys, Ile, Arg, Ala, Pro, Val or absent

 <220>
 <221> MOD_RES
 <222> (17)..(17)
 <223> Trp, Lys, Gly, Ala, Ile, Val or absent

 <220>
 <221> MOD_RES
 <222> (18)..(18)
 <223> Val, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent

 <220>
 <221> MOD_RES
 <222> (19)..(19)
 <223> Cys, Tyr or absent

 <220>
 <221> MOD_RES
 <222> (20)..(20)
 <223> Met, Lys, Arg, Tyr or absent

 <220>
 <221> MOD_RES
 <222> (21)..(21)
 <223> Arg, Met, Cys, Lys or absent

 <220>
 <221> MOD_RES
 <222> (22)..(22)
 <223> Arg, Lys, Ala or absent

 <220>
 <221> MOD_RES
 <222> (23)..(23)
 <223> Arg, Cys, Lys, Val or absent

 <220>
 <221> MOD_RES
 <222> (24)..(24)
 <223> Arg, Lys, Pro, Cys, Thr or absent

 <220>

<221> MOD_RES
<222> (25)..(25)
<223> Thr, Arg or absent

<220>
<221> misc_feature
<222> (11)..(25)
<223> This region may or may not be present

<220>
<223> C-term -NH2 or -OH

<400> 10
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

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

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Asp, Glu, Ala, Gly, Thr, Ida, pGlu, bhAsp, D-Asp, Tyr, Leu or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Thr, Ala, Aib, D-Thr, Arg or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> His, Lys, Ala or D-His

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe, Ala, Dpa, bhPhe or D-Phe

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro, Glu, Ser, Gly, Arg, Lys, Val, Ala, D-Pro, bhPro, Sarc, Abu or absent

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Ile, Cys, Arg, Leu, Lys, His, Glu, D-Ile, D-Arg, D-Cys, Val, Ser or Ala

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Cys, Ile, Ala, Leu, Val, Ser, Phe, Dapa, D-Ile or D-Cys

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val,
 D-Ile, D-Lys, D-Arg or Dapa

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Tyr, Lys, Arg, bhPhe or D-Phe

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<400> 11
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

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

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Gly, Cys, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

<220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Pro, Ala, Cys, Gly or absent

<220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> Arg, Lys, Pro, Gly, His, Ala, Trp or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Ser, Arg, Gly, Trp, Ala, His, Tyr or absent

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Lys, Met, Arg, Ala or absent

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Gly, Ser, Lys, Ile, Arg, Ala, Pro, Val or absent

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Trp, Lys, Gly, Ala, Ile, Val or absent

<220>
 <221> MOD_RES
 <222> (8)..(8)

<223> Val, Thr, Gly, Cys, Met, Tyr, Ala, Glu, Lys, Asp, Arg or absent

<220>

<221> MOD_RES

<222> (9)..(9)

<223> Cys, Tyr or absent

<220>

<221> MOD_RES

<222> (10)..(10)

<223> Met, Lys, Arg, Tyr or absent

<220>

<221> MOD_RES

<222> (11)..(11)

<223> Arg, Met, Cys, Lys or absent

<220>

<221> MOD_RES

<222> (12)..(12)

<223> Arg, Lys, Ala or absent

<220>

<221> MOD_RES

<222> (13)..(13)

<223> Arg, Cys, Lys, Val or absent

<220>

<221> MOD_RES

<222> (14)..(14)

<223> Arg, Lys, Pro, Cys, Thr or absent

<220>

<221> MOD_RES

<222> (15)..(15)

<223> Thr, Arg or absent

<400> 12

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

<210> 13

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl, C1-C6 alkyl or a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing

<220>

<221> MOD_RES

<222> (1)..(1)

<223> Asp, Glu, Ala, Gly, Thr, Ida, pGlu, hAsp, D-Asp, Tyr, Leu or absent

<220>

<221> MOD_RES

<222> (2)..(2)

<223> Thr, Ala, Aib, D-Thr, Arg or absent

<220>

<221> MOD_RES
 <222> (3)..(3)
 <223> His, Lys, Ala, D-His or Lys

 <220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe, Ala, Dpa, bhPhe or D-Phe

 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, Glu, Ser, Gly, Arg, Lys, Val, Ala, D-Pro, bhPro, Sarc, Abu or
 absent

 <220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Ile, Cys, Arg, Leu, Lys, His, Glu, D-Ile, D-Arg, D-Cys, Val, Ser
 or Ala

 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, Ile, Ala, Leu, Val, Ser, Phe, Dapa, D-Ile or D-Cys

 <220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu,
 Val, D-Ile, D-Lys, D-Arg or Dapa

 <220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Tyr, Lys, Arg, bhPhe or D-Phe

 <220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

 <400> 13
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

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

 <220>
 <223> Description of Artificial Sequence: Synthetic
 peptide

 <220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ala, Gly, Thr, Ida, pGlu, bhAsp, D-Asp, Tyr, Leu or
 absent

 <220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ala, Aib, D-Thr, Arg or absent

 <220>

<221> MOD_RES
 <222> (3)..(3)
 <223> His, Lys, Ala, D-His or Lys

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe, Ala, Dpa, bhPhe or D-Phe

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, Glu, Ser, Gly, Arg, Lys, Val, Ala, D-Pro, bhPro, Sarc, Abu or absent

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Ile, Cys, Arg, Leu, Lys, His, Glu, D-Ile, D-Arg, D-Cys, Val, Ser or Ala

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, Ile, Ala, Leu, Val, Ser, Phe, Dapa, D-Ile or D-Cys

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Arg, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg or Dapa

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Tyr, Lys, Arg, bhPhe or D-Phe

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<400> 14
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

<210> 15
 <211> 13
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl, C1-C6 alkyl or a C1-C20 alkanoyl, and including PEGylated, versions alone or as spacers of any of the foregoing

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ida or absent

<220>
 <221> MOD_RES

<222> (2)..(2)
 <223> Thr, Ser, Pro, Ala or absent

 <220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> His, Ala or Glu

 <220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe or Dpa

 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, bhPro, Sarc or Gly

 <220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser,
 Dapa or absent

 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser,
 Dapa or absent

 <220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val,
 D-Ile, D-Lys, D-Arg, Dapa or absent

 <220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent

 <220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

 <220>
 <221> MOD_RES
 <222> (11)..(11)
 <223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val,
 D-Ile, D-Lys, D-Arg, Dapa or absent

 <220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe or D-Phe or absent

 <220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Lys, Phe or absent

 <220>
 <221> misc_feature
 <222> (11)..(13)
 <223> This region may or may not be present

 <220>
 <223> C-term -NH2 or -OH

<400> 15
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 16
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Asp, Glu, Ida or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Thr, Ser, Pro, Ala or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> His, Ala or Glu

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe or Dpa

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro, bhPro, Sarc or Gly

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa or absent

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa or absent

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

<220>
<221> MOD_RES
<222> (9)..(9)
<223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys, Phe or absent

<400> 16
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 17
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val,
D-Ile, D-Lys, D-Arg, Dapa or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe or D-Phe or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Lys, Phe or absent

<400> 17
Xaa Xaa Xaa
1

<210> 18
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Asp, Glu, Ida, pGlu, bhAsp, D-Asp or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Thr, Ser, Lys, Glu, Pro, Ala or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> His, Ala or Glu

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe, Ile or Dpa

<220>
<221> MOD_RES
<222> (5)..(5)

<223> Pro, bhPro, Sarc or Gly
 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> absent or any amino acid except Ile, Cys or (D)-Cys

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> absent or any amino acid except Cys or (D)-Cys

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ile, Tyr, bhPhe or D-Phe or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<400> 18
 Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa
 1 5 10

<210> 19
 <211> 12
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term may or may not include PEG3

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Gly, Sarc, Lys, Glu, Ala, Phe, Pro, Glu, Lys, D-Pro, Val, Ser or absent

<220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Pro, Ala, Gly or absent

<220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> Arg, Lys, Pro, Gly, His, Ala or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Ser, Arg, Glu or absent

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Lys, Ser, Met, Arg, Ala or absent

<220>
 <221> MOD_RES
 <222> (6)..(6)

<223> Gly, Sarc, Glu, Leu, Phe, His or absent

<220>

<221> MOD_RES

<222> (7)..(7)

<223> Trp, N-Methyl Trp, Lys, Thr, His, Gly, Ala, Ile, Val or absent

<220>

<221> MOD_RES

<222> (8)..(8)

<223> Val, Trp, Ala, Asn, Glu or absent

<220>

<221> MOD_RES

<222> (9)..(9)

<223> Val, Ala, Asn, Asp, Cys or absent

<220>

<221> MOD_RES

<222> (10)..(10)

<223> Cys, (D)-Cys, Glu or absent

<220>

<221> MOD_RES

<222> (11)..(11)

<223> Tyr, Met or absent

<220>

<221> MOD_RES

<222> (12)..(12)

<223> May or may not be present

<400> 19

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Trp
1 5 10

<210> 20

<211> 25

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (1)..(25)

<223> Any amino acid

<220>

<221> misc_feature

<222> (1)..(10)

<223> This region may encompass 1-10 residues

<220>

<221> misc_feature

<222> (11)..(25)

<223> This region may encompass 1-15 residues

<220>

<223> see specification as filed for detailed description of substitutions and preferred embodiments

<400> 20

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25

<210> 21
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Asp, Glu, Ida, Lys or absent

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Thr, Ser, Lys or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> His, Ala or Lys

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe, Dpa or Lys

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro, bhPro, Gly or Lys

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa, Thr or absent

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ile, Arg, Lys, Glu, Asn, Asp, Ala, Gln, Phe, Glu, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

<220>
<221> MOD_RES
<222> (9)..(9)
<223> Phe, Tyr, bhPhe, Lys or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys, Phe or absent

<400> 21
Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa
1 5 10

<210> 22
<211> 10

<212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic peptide

 <220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ida, Lys or absent

 <220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ser, Lys or absent

 <220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> His, Ala, Lys

 <220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe, Dpa or Lys

 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, bhPro, Gly or Lys

 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa, Thr or absent

 <220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Arg, Lys, Glu, Asn, Asp, Ala, Gln, Phe, Glu, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

 <220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Tyr, bhPhe, Lys or absent

 <220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

 <400> 22
 Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa
 1 5 10

 <210> 23
 <211> 35
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic polypeptide

<220>
 <223> N-term bond (e.g., a covalent bond) or selected from hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing

<220>
 <221> MOD_RES
 <222> (1)..(35)
 <223> Any amino acid

<220>
 <221> misc_feature
 <222> (1)..(35)
 <223> This sequence may encompass 7 to 35, 8 to 35, 9 to 35, 10 to 35, 7 to 25, 8 to 25, 9 to 25, 10 to 25, 7 to 18, 8 to 18, 9 to 18, or 10 to 18 amino acid residues

<220>
 <223> C-term may not may not include a bond (e.g., a covalent bond), -OH or NH2

<400> 23
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 20 25 30

 Xaa Xaa Xaa
 35

<210> 24
 <211> 14
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term may include a bond (e.g., a covalent bond), hydrogen, a C1-C6 alkyl, a C6-C12 aryl, a C6-C12 aryl C1-C6 alkyl, a C1-C20 alkanoyl, and including PEGylated versions alone or as spacers of any of the foregoing

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ida or absent

<220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ser, Pro, Ala or absent

<220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> His, Ala, Glu or Ala

<220>
 <221> MOD_RES
 <222> (4)..(4)

<223> Phe or Dpa
 <220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, bhPro, Sarc or Gly
 <220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa
 or absent
 <220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa
 or absent
 <220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile,
 D-Lys, D-Arg, Dapa or absent
 <220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent
 <220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent
 <220>
 <221> MOD_RES
 <222> (12)..(12)
 <223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile,
 D-Lys, D-Arg, Dapa or absent
 <220>
 <221> MOD_RES
 <222> (13)..(13)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent
 <220>
 <221> MOD_RES
 <222> (14)..(14)
 <223> Lys, Phe or absent
 <220>
 <221> misc_feature
 <222> (12)..(14)
 <223> This region may be present or absent
 <220>
 <223> C-term may include a bond (e.g., a covalent bond), -OH or -NH2
 <400> 24
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Lys Xaa Xaa Xaa
 1 5 10
 <210> 25
 <211> 10
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu, Ida or absent

<220>
 <221> MOD_RES
 <222> (2)..(2)
 <223> Thr, Ser, Pro, Ala or absent

<220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> His, Ala, Glu or Ala

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe or Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro, bhPro, Sarc or Gly

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa or absent

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, (D)-Cys, Arg, Glu, Phe, Gln, Leu, Val, Lys, Ala, Ser, Dapa or absent

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Lys, Phe or absent

<400> 25
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

<210> 26
 <211> 3
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 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (1)..(1)

<223> Ile, Arg, Lys, Ala, Gln, Phe, Glu, Asp, Tyr, Ser, Leu, Val, D-Ile, D-Lys, D-Arg, Dapa or absent

<220>

<221> MOD_RES

<222> (2)..(2)

<223> Phe, Ala, Ile, Thr, Tyr, Lys, Arg, bhPhe, D-Phe or absent

<220>

<221> MOD_RES

<222> (3)..(3)

<223> Lys, Phe or absent

<400> 26

Xaa Xaa Xaa

1

<210> 27

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (1)..(1)

<223> Asp, Ida, pGlu, bhAsp or absent

<220>

<221> MOD_RES

<222> (4)..(4)

<223> Phe or Dpa

<220>

<221> MOD_RES

<222> (5)..(5)

<223> Pro or bhPro

<220>

<221> MOD_RES

<222> (6)..(6)

<223> Ile, Cys or Arg

<220>

<221> MOD_RES

<222> (7)..(7)

<223> Cys, Ile, Leu or Val

<220>

<221> MOD_RES

<222> (8)..(8)

<223> Ile, Lys, Glu, Phe, Gln or Arg

<220>

<221> MOD_RES

<222> (10)..(10)

<223> Lys, Phe or absent

<400> 27
Xaa Thr His Xaa Pro Xaa Xaa Xaa Phe Xaa
1 5 10

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

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 28
Asp Thr His Phe Pro Cys Ile Ile Phe
1 5

<210> 29
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 29
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 30
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 30

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

Val Cys Lys

<210> 31
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Isovaleric acid

<220>
 <223> C-term NH2

<400> 31
 Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
 1 5 10 15

Val Cys

<210> 32
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
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<220>
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 <223> Ida

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> bhPro

<220>
 <223> C-term NH2

<400> 32
 Xaa Thr His Xaa Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
 1 5 10 15

Val Cys Met

<210> 33
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 33
Asp Thr His Phe Pro Cys Ile Phe Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 34
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 34
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Thr Cys Lys

<210> 35
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Ida

<220>
<221> MOD_RES
<222> (4)..(4)

<223> Dpa

<220>

<221> MOD_RES

<222> (5)..(5)

<223> bhPro

<220>

<223> C-term NH2

<400> 35

Xaa Thr His Xaa Pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly Trp
1 5 10 15

Val Cys Lys

<210> 36

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 36

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

Val Cys Lys

<210> 37

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 37

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

Val Cys Lys

<210> 38
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 38
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 39
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 39
Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys Gly His Arg Ser Ile
1 5 10 15

Cys Tyr Arg Arg Cys Arg
20

<210> 40
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isobutyric acid

<220>
<223> C-term NH2

<400> 40
Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys His Arg Ser Lys Gly
1 5 10 15
36

Cys Tyr Arg Arg Cys Arg
20

<210> 41
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 41
Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys His Arg Ser Lys Gly
1 5 10 15

Cys Tyr Arg Ala Cys
20

<210> 42
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 42
Asp Thr His Phe Pro Cys Ile Glu Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 43
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>

<223> C-term NH2

<400> 43

Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ala Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 44

<211> 22

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isobutyric acid

<220>

<223> C-term NH2

<400> 44

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

Cys Tyr Arg Arg Cys Arg
20

<210> 45

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 45

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

Val Cys Met

<210> 46

<211> 22

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
38

peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 46

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

Cys Tyr Arg Arg Cys Arg
20

<210> 47

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 47

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

Val cys Lys

<210> 48

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 48

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

Val cys Met

<210> 49

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

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 49
Asp Thr His Phe Pro Ile Cys Ile Phe Ala Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 50
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term OH

<400> 50
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

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

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 51
Asp Thr His Phe Pro Cys Ile Gln Phe
1 5

<210> 52
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 52
Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys Gly His Arg Ser Lys
1 5 10 15

Gly Cys Tyr Arg Arg Cys Arg
20

<210> 53
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 53
Asp Thr His Phe Ala Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 54
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 54
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro His Arg Ser Lys Gly
41

1 5 10 15

Trp Val Cys Met
20

<210> 55
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 55
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ala Lys Gly Trp
1 5 10 15

Val Cys Met

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

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 56
Asp Thr His Phe Pro Ala Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 57
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<223> N-term Hy

<220>

<223> C-term NH2

<400> 57

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

Cys Tyr Arg Arg Val Cys Arg
20

<210> 58

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 58

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

Val Cys Met

<210> 59

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 59

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

Gly Cys Tyr Arg Arg Cys Arg
20

<210> 60

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 60

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

Val Cys Met

<210> 61

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 61

Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Ala Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 62

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 62

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

Cys Tyr Ala Arg Cys
20

<210> 63
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Ac

<220>
<223> C-term NH2

<400> 63
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 64
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 64
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Ala Gly Trp
1 5 10 15

Val Cys Met

<210> 65
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 65
Asp Thr His Ala Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 66
<211> 21
<212> PRT
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 66
Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys His Arg Ser Lys Gly
1 5 10 15

Cys Tyr Arg Arg Cys
20

<210> 67
<211> 22
<212> PRT
<213> Artificial sequence

<220>
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<220>
<221> MOD_RES
<222> (1)..(1)
<223> pGlu

<220>
<223> C-term NH2

<400> 67
Glu Thr His Phe Pro Ile Cys Ile Phe Val Cys His Arg Ser Lys Gly
1 5 10 15

Cys Tyr Arg Arg Cys Arg
20

<210> 68
<211> 19
<212> PRT
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term AC

<220>

<223> C-term NH2

<400> 68

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

Val Cys Met

<210> 69

<211> 24

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 69

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

Gly Cys Tyr Met Arg Cys Lys Thr
20

<210> 70

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 70

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

Val Cys Met

<210> 71

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 71

Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys Tyr Arg Gly Ile Cys
1 5 10 15

Tyr Arg Arg Cys Arg
20

<210> 72

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Ac

<220>

<223> C-term NH2

<400> 72

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

Val Cys Met

<210> 73

<211> 18

<212> PRT

<213> Artificial sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<221> MOD_RES

<222> (1)..(1)

<223> bhAsp

<220>

<223> C-term NH2

<400> 73

Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
48

1 5 10 15

Val Cys

<210> 74
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Hy

<220>
 <223> C-term NH2

<400> 74
 Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
 1 5 10 15

Ala Cys Met

<210> 75
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
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<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Ida

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> bhPro

<220>
 <221> MOD_RES
 <222> (9)..(9)
 <223> bhPhe

<220>
 <223> C-term NH2

<400> 75
 Xaa Thr His Xaa Pro Arg Cys Arg Phe Gly Pro Arg Ser Lys Gly Trp
 1 5 10 15

Val Cys Met

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

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 76
Asp Thr His Phe Pro Cys Ile Arg Phe
1 5

<210> 77
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 77
Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp Val
1 5 10 15

Cys Met

<210> 78
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 78
Asp Thr His Phe Pro Cys Ile Ala Phe

1 5

<210> 79
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 79
Asp Ala His Phe Pro Cys Ile Ile Phe
1 5

<210> 80
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 80
Asp Thr His Phe Pro Ile Cys Ile Phe Val Cys His Arg Pro Lys Gly
1 5 10 15

Cys Tyr Arg Arg Cys Pro
20

<210> 81
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Ac

<220>
<221> MOD_RES
<222> (14)..(14)
<223> Lys(m-PEG8)

<220>
<223> C-term NH2

<400> 81
 Asp Thr His Phe Pro Ile Cys Ile Phe Lys Pro Arg Ser Lys Gly Trp
 1 5 10 15

Val Cys Met

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

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Hy

<220>
 <223> C-term NH2

<400> 82
 Asp Thr His Phe Pro Cys Ile Ile Phe Lys
 1 5 10

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

<220>
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<220>
 <223> N-term Hy

<220>
 <223> C-term NH2

<400> 83
 Asp Thr His Phe Pro Cys Ile Phe Phe
 1 5

<210> 84
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Hy

<220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Lys(m-PEG8)

<220>
 <223> C-term NH2
 <400> 84
 Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Lys Trp
 1 5 10 15

Val Cys Met

<210> 85
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Ac
 <220>
 <223> C-term NH2

<400> 85
 Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Lys Trp
 1 5 10 15

Val Cys Met

<210> 86
 <211> 17
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Hy
 <220>
 <223> C-term NH2

<400> 86
 Asp Thr His Phe Pro Ile Cys Ile Phe Cys Pro Trp Gly Met Cys Cys
 1 5 10 15

Lys

<210> 87
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 87

Asp Thr Ala Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 88

<211> 22

<212> PRT

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<220>

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<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 88

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Tyr Met Arg Cys Lys Thr
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<210> 89

<211> 19

<212> PRT

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<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 89

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

Val Cys Met

<210> 90
<211> 19
<212> PRT
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<220>
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<220>
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<220>
<223> C-term NH2

<400> 90
Asp Thr His Phe Pro Ile Cys Ile Ala Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 91
<211> 19
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<220>
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<220>
<223> C-term NH2

<400> 91
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1 5 10 15

Val Cys Met

<210> 92
<211> 19
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<220>
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<220>
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<220>
<223> C-term NH2

<400> 92
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1 5 10 15

Val Ala Met

<210> 93
<211> 18
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<220>
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<220>
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Val Cys

<210> 94
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<223> bhPro

<220>
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<223> bhPhe

<220>
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<400> 94
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1 5 10 15

Val Cys

<210> 95

<400> 95
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<210> 96
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<220>
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<220>
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<220>
<223> C-term NH2

<400> 96
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Cys Tyr Trp Ala Val Cys
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<210> 97
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<223> D-Cys

<220>
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<400> 97
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Cys Tyr Trp Ala Val Cys Phe
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<210> 98
<211> 24
<212> PRT
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<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 98
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1 5 10 15

Cys Tyr Trp Ala Val Cys Phe Trp
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<210> 99
<211> 19
<212> PRT
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<220>
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<223> Lys(m-PEG8)

<220>
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Val Cys Met

<210> 100

<400> 100
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<210> 101
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<223> Dpa

<220>
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Val Cys Lys

<210> 102
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<220>
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Val Cys Lys

<210> 103
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<220>
<223> C-term NH2

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Arg Cys Lys

<210> 104
<211> 19
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<220>
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<220>
<223> C-term NH2

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1 5 10 15

Val Cys Lys

<210> 105
<211> 19
<212> PRT
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<220>
<223> C-term NH2

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

Arg Cys Lys

<210> 106
<211> 19
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<220>
<223> C-term NH2

<400> 106
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Val Cys Lys

<210> 107
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<212> PRT
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<220>
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<220>
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<400> 107
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly Val
1 5 10 15

Cys Lys

<210> 108
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<220>
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1 5 10 15

Val Cys Lys

<210> 109
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<400> 109
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Val Cys Lys

<210> 110
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<220>
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Val Cys Lys

<210> 111
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<400> 111
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Val Cys Lys

<210> 112
 <211> 19
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<213> Artificial Sequence

<220>

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<220>

<223> N-term Palm-PEG11

<220>

<223> C-term NH2

<400> 112

Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly Trp
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Val Cys Lys

<210> 113

<211> 19

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<223> Lys(2K-PEG)

<220>

<223> C-term NH2

<400> 113

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Val Cys Lys

<210> 114

<211> 19

<212> PRT

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<223> C-term NH2

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Lys Cys Lys

<210> 115
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Lys Cys Lys

<210> 116
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<220>
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Val cys Lys

<210> 117
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<220>

<223> C-term NH2

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Val Cys Lys

<210> 118

<211> 19

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<223> C-term NH2

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Val Cys Lys

<210> 119

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Val Cys Lys

<210> 120

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Cys Lys

<210> 121
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<223> C-term NH2

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Cys Lys

<210> 122
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His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp Val Cys
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Lys

<210> 123
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His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp Val Cys
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Val Cys Lys

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67

1 5 10 15

Val Cys Lys

<210> 126
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Glu Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly
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Trp Val Cys Lys
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<210> 128
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<220>
<223> C-term NH2

<400> 128
Asp Thr His Phe Pro Cys Ile Ile Phe Glu Pro Arg Ser Lys Gly Trp
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Val Cys Lys

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<223> C-term NH2

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Asp Thr His Phe Pro Cys Ile Ile Phe Ser Pro Arg Ser Lys Gly Trp
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Val Cys Lys

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<223> C-term NH2

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Val Cys Lys

<210> 131

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<223> N-term Octanoic acid-PEG11

<220>

<223> C-term NH2

<400> 131

Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly Trp
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Val Cys Lys

<210> 132
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<220>
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Val Cys Lys

<210> 133
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1 5 10 15

Val Cys Lys

<210> 134
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<220>
<223> C-term NH2

<400> 134

Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Lys Ser Lys Gly Trp
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Val Cys Lys

<210> 135
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 1 5 10 15

Val Cys Lys

<210> 136
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<220>
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<400> 136
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 1 5 10 15

Cys Lys

<210> 137
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<220>

<223> N-term Isovaleric acid

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<223> C-term NH2

<400> 137

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

Cys

<210> 138

<211> 17

<212> PRT

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<220>

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<223> C-term NH2

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

Lys

<210> 139

<400> 139

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<210> 140

<211> 19

<212> PRT

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<223> Dapa

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<223> C-term NH2

<400> 140

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Asp Cys Lys

<210> 141
<211> 19
<212> PRT
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<220>
<223> C-term NH2

<400> 141
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1 5 10 15

Asp Cys Lys

<210> 142
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<220>
<223> C-term NH2

<400> 142
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Glu Cys Lys

<210> 143
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Glu Cys Lys

<210> 144

<211> 19

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1 5 10 15

Glu Cys Lys

<210> 145

<211> 19

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Asp Thr His Phe Gly Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 146

<211> 19

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Asp Thr His Phe Gly Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 147

<211> 19

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<223> N-term Isovaleric acid

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<223> C-term NH2

<400> 147

Asp Thr His Phe Arg Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 148

<211> 19

<212> PRT

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<220>

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<223> C-term NH2

<400> 148

Asp Thr His Phe Arg Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 149

<211> 19

<212> PRT

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<220>

<223> C-term NH2

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Asp Thr His Phe Xaa Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 150

<211> 19

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<222> (5)..(5)

<223> Sarc

<220>

<223> C-term NH2

<400> 150

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

Val Cys Lys

<210> 151
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<220>
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<400> 151
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1 5 10 15

Val Cys Lys

<210> 152
<211> 19
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<220>
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<223> Beta-Ala

<220>
<223> C-term NH2

<400> 152
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Val Cys Lys

<210> 153
<211> 19
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<220>
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<220>
<223> C-term NH2

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

Val Cys Lys

<210> 154
<211> 19
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<220>
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<220>
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<400> 154
Asp Thr His Phe Lys Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 155
<211> 18
<212> PRT
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Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp Val
1 5 10 15

Cys Met

<210> 156
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<220>
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Met

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1 5 10 15

Met

<210> 158
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<220>
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 1 5 10 15

Val Cys Met

<210> 159
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Val Cys Met

<210> 160
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Val Cys Met

<210> 163
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Val Cys Lys

<210> 164
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Val Cys Lys

<210> 166
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<210> 167
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<220>
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Val Cys Lys

<210> 173

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Val Cys Lys

<210> 174
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<223> Lys(m-PEG8)

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Thr Cys Lys

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Thr Cys Lys

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<223> Lys(Betaine)

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Val Cys Lys

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<223> C-term NH2

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Val Cys Lys

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Val Cys Lys

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<223> C-term NH2

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Val Cys Lys

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Glu Cys Lys

<210> 196
<211> 19
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<220>

<223> C-term NH2

<400> 196

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Val Cys Lys

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<210> 200

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Val Cys Lys

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Val Cys Lys

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<223> Lys(PEG2)

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Val Cys Lys

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Val Cys Lys

<210> 205

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Thr Cys Lys

<210> 206
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Cys Lys

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Lys

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Lys

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 <223> Lys(Palm)

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Val Cys Lys

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Val Cys Lys

<210> 219
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Val Cys Lys

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Val Cys Lys

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1 5 10 15

Val Cys Lys

<210> 223
<211> 19
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<220>
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<220>
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<220>
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<223> Lys(PEG3-Palm)

<220>
<223> C-term NH2

<400> 223
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1 5 10 15

Val Cys Lys

<210> 224
<211> 19
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<220>
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<220>

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<220>

<221> MOD_RES

<222> (12)..(12)

<223> Lys(PEG3-Palm)

<220>

<223> C-term NH2

<400> 224

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Lys Ser Lys Gly Trp
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Val Cys Lys

<210> 225

<211> 19

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<223> Lys(PEG3-Palm)

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<223> C-term NH2

<400> 225

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 226

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<220>

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<223> Lys(PEG3-Palm)

<220>

<223> C-term NH2

<400> 226

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 227

<211> 19

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<220>

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<220>

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<223> Lys(IVA)

<220>

<223> C-term NH2

<400> 227

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

Val Cys Lys

<210> 228

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

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<223> Lys(IVA)

<220>

<223> C-term NH2

<400> 228

Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 229
<211> 19
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<220>
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<400> 229
Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Lys Ser Lys Gly Trp
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Val Cys Lys

<210> 230
<211> 19
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<220>
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<400> 230
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Val Cys Lys

<210> 231
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Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 232
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Val Cys Lys

<210> 233
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Val Cys Lys

<210> 234
<211> 19
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<223> Lys(PEG3-IVA)

<220>
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Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Lys Ser Lys Gly Trp
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Val Cys Lys

<210> 235
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<223> Lys(PEG3-IVA)

<220>
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<400> 235

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 236
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 <223> Lys(PEG3-IVA)

<220>
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<400> 236
 Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 237
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<220>
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<220>
 <223> C-term NH2

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 Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Lys Trp
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Val Cys Lys

<210> 238
 <211> 19
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<220>

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<223> N-term Hy

<220>

<223> C-term NH2

<400> 238

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 239

<211> 19

<212> PRT

<213> Artificial sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Palm

<220>

<223> C-term NH2

<400> 239

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 240

<211> 19

<212> PRT

<213> Artificial sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Palm-PEG3

<220>

<223> C-term NH2

<400> 240

Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 241
<211> 17
<212> PRT
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<220>
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<221> MOD_RES
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<223> Lys(isoGlu-Palm)

<220>
<223> C-term NH2

<400> 241
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Cys
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Lys

<210> 242
<211> 17
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<221> MOD_RES
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<223> Lys(isoGlu-Palm)

<220>
<223> C-term NH2

<400> 242
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Cys
1 5 10 15

Lys

<210> 243
<211> 17
<212> PRT
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 <223> Lys(isoGlu-Palm)

 <220>
 <223> C-term NH2

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 Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Lys Ser Lys Gly Cys
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Lys

<210> 244
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 <223> Lys(isoGlu-Palm)

 <220>
 <223> C-term NH2

 <400> 244
 Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Cys
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Lys

<210> 245
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 <212> PRT
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 <223> Lys(isoGlu-Palm)

<220>
 <223> C-term NH2

<400> 245
 Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Lys Cys
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Lys

<210> 246
 <211> 17
 <212> PRT
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<220>
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 <221> MOD_RES
 <222> (17)..(17)
 <223> Lys(isoGlu-Palm)

<220>
 <223> C-term NH2

<400> 246
 Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Cys
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Lys

<210> 247
 <211> 18
 <212> PRT
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<220>
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<220>
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 <222> (18)..(18)
 <223> Lys(isoGlu-Palm)

<220>
 <223> C-term NH2

<400> 247
 Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Cys
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Lys Lys

<210> 248
<211> 17
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<223> Lys(Dapa-Palm)

<220>
<223> C-term NH2

<400> 248
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Cys
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Lys

<210> 249
<211> 17
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<223> Lys(Dapa-Palm)

<220>
<223> C-term NH2

<400> 249
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Cys
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Lys

<210> 250
<211> 17
<212> PRT
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<220>

<221> MOD_RES

<222> (12)..(12)

<223> Lys(Dapa-Palm)

<220>

<223> C-term NH2

<400> 250

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

Lys

<210> 251

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

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<220>

<221> MOD_RES

<222> (14)..(14)

<223> Lys(Dapa-Palm)

<220>

<223> C-term NH2

<400> 251

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

Lys

<210> 252

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

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peptide

<220>

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<220>

<221> MOD_RES

<222> (15)..(15)

<223> Lys(Dapa-Palm)

<220>

<223> C-term NH2

<400> 252

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

Lys

<210> 253

<211> 18

<212> PRT

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<220>

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<220>

<221> MOD_RES

<222> (17)..(17)

<223> Lys(Dapa-Palm)

<220>

<223> C-term NH2

<400> 253

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

Lys Lys

<210> 254

<211> 18

<212> PRT

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<220>

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<220>

<221> MOD_RES

<222> (18)..(18)

<223> Lys(Dapa-Palm)

<220>

<223> C-term NH2

<400> 254

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

Lys Lys

<210> 255

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 255

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

Val Cys Lys

<210> 256

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 256

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

Val Cys Lys

<210> 257

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 257

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

Val Cys Lys

<210> 258

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 258

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

Val Cys Lys

<210> 259

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 259

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

Val Cys Lys

<210> 260

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>
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<220>
<223> C-term OH

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

Val Cys Lys

<210> 261
<211> 19
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<213> Artificial sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term OH

<400> 261
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 262
<211> 19
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<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term OH

<400> 262
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys Lys

<210> 263
<211> 18

<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term OH

<400> 263
Asp Thr His Phe Pro Cys Ile Ile Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys

<210> 264
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(isoGlu-Palm)

<220>
<223> C-term NH2

<400> 264
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys Lys

<210> 265
<211> 19
<212> PRT
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<220>
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<220>
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<220>
<221> MOD_RES
<222> (12)..(12)

<223> Lys(isoGlu-Palm)

<220>

<223> C-term NH2

<400> 265

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

Glu Cys Lys

<210> 266

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 266

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

Glu Cys Lys

<210> 267

<211> 17

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

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<223> Ida

<220>

<221> MOD_RES

<222> (15)..(15)

<223> Lys(isoGlu-Palm)

<220>

<223> C-term NH2

<400> 267

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

Lys

<210> 268
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Lys(isoGlu-Palm)

<220>
<223> C-term OH

<400> 268
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys

<210> 269
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term 4,4-5,5-6,6,6-Heptafluorohexanoic acid

<220>
<223> C-term NH2

<400> 269
Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 270
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(mysterious acid)

<220>
<223> C-term NH2

<400> 270
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 271
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(lauric acid)

<220>
<223> C-term NH2

<400> 271
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 272
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(decanoic acid)

<220>
<223> C-term NH2

<400> 272
 Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
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Val Cys

<210> 273
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
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<220>
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 <223> Lys(Octanoic acid)

<220>
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<400> 273
 Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
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Val Cys

<210> 274
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
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<220>
 <223> N-term Isovaleric acid

<220>
 <221> MOD_RES
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 <223> Lys(Hexanoic acid)

<220>
 <223> C-term NH2

<400> 274
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Val Cys

<210> 275
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(Butyric acid)

<220>
<223> C-term NH2

<400> 275
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 276
<211> 18
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<220>
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<220>
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<220>
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<223> Lys(Ac)

<220>
<223> C-term NH2

<400> 276
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 277
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<221> MOD_RES
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<223> Ida

<220>
<221> MOD_RES
<222> (19)..(19)
<223> Lys(mysterious acid)

<220>
<223> C-term NH2

<400> 277
Xaa Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 278
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Ida

<220>
<221> MOD_RES
<222> (19)..(19)
<223> Lys(lauric acid)

<220>
<223> C-term NH2

<400> 278
Xaa Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 279
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
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<220>
<223> C-term NH2

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1 5 10 15

Val Cys Lys

<210> 280
<211> 19
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<223> Ida

<220>
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<222> (19)..(19)
<223> Lys(octanoic acid)

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Val Cys Lys

<210> 281
<211> 19
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<222> (19)..(19)
<223> Lys(hexanoic acid)

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 <223> C-term NH2

<400> 281
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Val Cys Lys

<210> 282
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<220>
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 <222> (19)..(19)
 <223> Lys(butyric acid)

<220>
 <223> C-term NH2

<400> 282
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Val Cys Lys

<210> 283
 <211> 19
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 <223> Lys(Ac)

<220>
 <223> C-term NH2

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Val Cys Lys

<210> 284
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 <223> Lys(Octanoic acid)

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 <223> C-term NH2

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Lys

<210> 285
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 <223> Lys(lauric acid)

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 <223> C-term NH2

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Lys

<210> 286
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<220>
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Lys

<210> 287
<211> 16
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<220>
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<210> 288
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Lys

<210> 289
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<210> 290
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<212> PRT
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<223> C-term NH2

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<210> 292
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<220>
<223> C-term NH2

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<210> 293
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<220>
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<220>
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<210> 297
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<223> C-term NH2

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<223> N-term Hy

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<223> C-term NH2

<400> 298

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<210> 299

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<210> 300

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<210> 301

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<210> 302
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<210> 305

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<223> C-term NH2

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<223> C-term NH2

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<223> C-term NH2

<400> 307

Ala Thr His Phe Pro Cys Ile Ile Phe
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1 5

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<223> C-term NH2

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<210> 311

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Asp Thr His Phe Pro Ser Ile Ile Phe
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<223> C-term NH2

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<223> C-term NH2

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<223> C-term NH2

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<210> 327

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<223> C-term NH2

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<400> 328
Asp Thr His Phe Pro Cys Ile Ile Arg
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<223> C-term NH2

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Asp Thr His Phe Pro Cys Ile Glu Phe
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Asp Thr His Phe Pro Cys Ile Val Phe
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<210> 331

<211> 9

<212> PRT

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<223> C-term NH2

<400> 331

Asp Thr His Phe Pro Cys Ile Leu Phe
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<210> 332

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<223> C-term NH2

<400> 332

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Ser Lys Cys Gly Met Cys Cys Lys Thr
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<223> C-term NH2

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1 5 10 15

Lys

<210> 370

<211> 17

<212> PRT

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<220>

<223> Description of Artificial Sequence: Synthetic
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<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 370

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

Lys

<210> 371

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 371

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1 5 10 15

Lys

<210> 372

<211> 17

<212> PRT

<213> Artificial Sequence

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<220>

<223> N-term Isovaleric acid

<220>

<221> MOD_RES

<222> (10)..(10)

<223> Lys(isoGlu-Palm)

<220>

<223> C-term NH2

<400> 372

Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro His Ser Lys Glu Cys
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Lys

<210> 373

<211> 15

<212> PRT

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<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 373

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

<210> 374

<211> 15

<212> PRT

<213> Artificial Sequence

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<220>

<223> C-term NH2

<400> 374

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<210> 375

<211> 14

<212> PRT

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<223> N-term Isovaleric acid

<220>

<223> C-term NH2

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<210> 376

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<212> PRT

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<210> 378
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1 5

<210> 379
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peptide

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His Phe Pro Ile Cys Ile
1 5

<210> 380
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<220>
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1 5

<210> 381
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<400> 381
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<210> 382
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1 5

<210> 383
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Asp Thr His Phe Pro Ile Ala Ile Phe Cys
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<223> Cys(S-tBu)

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<210> 386

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<223> Cys(tBu)

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<210> 387
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<400> 387
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<210> 388
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peptide

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<223> Description of Artificial Sequence: Synthetic
peptide

<400> 394

Cys Asp Thr His Phe Pro Ile Cys Ile Phe
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<210> 395

<211> 9

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<400> 395

Asp Thr His Phe Pro Ile Cys Ile Phe
1 5

<210> 396

<211> 8

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<223> Description of Artificial Sequence: Synthetic
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<400> 396

Cys His Phe Pro Ile Cys Ile Phe
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<210> 397

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<223> D-Asp

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Pro Xaa Gly Pro Xaa Gly Pro Xaa Gly Pro Xaa Gly Pro Xaa Gly Pro
20 25 30

Xaa Gly Pro Xaa Gly Pro Xaa
35

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<400> 406

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<400> 426
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1 5 10

<210> 436
<211> 8
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<220>
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<223> Amc

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<222> (7)..(7)
<223> Inp

<220>

<221> MOD_RES
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<223> Dpa

<220>
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<400> 436
Cys Xaa Xaa Xaa Arg Xaa Xaa Xaa
1 5

<210> 437
<211> 8
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<223> Inp

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<223> Dpa

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<400> 437
Cys Pro Xaa Xaa Arg Xaa Xaa Xaa
1 5

<210> 438
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Cys Pro Xaa Xaa Arg Xaa Xaa Xaa
1 5

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<223> Inp

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<220>
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<400> 439
Cys Gly Xaa Xaa Arg Xaa Xaa Xaa
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<210> 440
<211> 9
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<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 440
Asp Thr His Phe Pro Cys Ala Ile Phe
1 5

<210> 441
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<220>
<223> C-term NH2

<400> 441
Asp Thr His Phe Pro Cys Arg Arg Phe
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<210> 442
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<220>
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<220>
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<210> 448
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<220>

<223> C-term NH2

<400> 448

Asp Thr His Phe Pro Cys Leu Ile Phe
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<210> 449

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<220>

<223> C-term NH2

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<210> 450

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<223> C-term NH2

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<400> 451

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<223> C-term NH2

<400> 452

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<223> C-term NH2

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<210> 454

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<223> C-term NH2

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<400> 455
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<210> 456
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Cys

<210> 457
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<220>
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<400> 457
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1 5 10 15

Val Cys

<210> 458
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<400> 458
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Cys

<210> 459
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<223> C-term NH2

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Val Cys Lys

<210> 460
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<400> 460
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Val Cys Lys

<210> 461
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<400> 461
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Val Cys Lys

<210> 462
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<220>
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<400> 462
Asp Thr His Phe Pro Cys Ser Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 463
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<400> 463
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Val Cys Lys

<210> 464
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<220>
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<400> 464
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1 5 10 15

Val Cys Lys

<210> 465
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<223> Dapa

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<223> C-term NH2

<400> 465

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Asp Cys Lys

<210> 466

<211> 19

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<223> Dapa

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<223> C-term NH2

<400> 466

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Glu Cys Lys

<210> 467

<211> 19

<212> PRT

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<220>

<223> C-term NH2

<400> 467

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

Glu Cys Lys

<210> 468
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<220>
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<220>
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Asp Thr His Phe Pro Cys Arg Arg Phe Gly Pro Arg Ser Lys Gly Trp
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Val Cys Lys

<210> 469
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Val Cys Lys

<210> 470
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<210> 471

<211> 9

<212> PRT

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<223> C-term NH2

<400> 471

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<210> 472

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<212> PRT

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<223> N-term Hy

<220>

<223> C-term NH2

<400> 472

Asp Thr His Ile Cys Ile Ala Ile Phe
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<210> 473

<211> 9

<212> PRT

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<223> N-term Hy

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<400> 473

Asp Thr His Cys Pro Ile Ala Ile Phe
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<400> 474

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 <220>
 <223> C-term NH2

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 Asp Thr His Phe Pro Cys Ile Ile Phe Ala Ala
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 <210> 480
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 <220>
 <223> C-term NH2

<400> 480
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<210> 481
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<400> 481
Asp Thr His Lys Pro Cys Ile Ile Phe
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<210> 482
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<220>
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<400> 482
Asp Thr His Val Pro Cys Ile Ile Phe
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<210> 483
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<220>
<223> C-term NH2

<400> 483
Asp Thr His Phe Val Cys Ile Ile Phe
1 5

<210> 484
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<220>
<223> C-term NH2

<400> 484
Asp Thr His Phe Pro Cys Ile Ile Tyr
1 5

<210> 485
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<220>
<223> C-term NH2

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<210> 486
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<210> 487
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<223> C-term NH2

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<210> 488

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<220>

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<223> N-Me-Trp

<220>

<223> C-term NH2

<400> 488

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Val cys

<210> 489

<211> 18

<212> PRT

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<222> (16)..(16)

<223> N-Me-Trp

<220>
 <223> C-term NH2

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Val Cys

<210> 490
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<220>
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<400> 490
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 1 5 10 15

Val Cys

<210> 491
 <211> 19
 <212> PRT
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<220>
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<220>
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Val Cys Lys

<210> 492
<211> 19
<212> PRT
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<220>
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<220>
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<220>
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<400> 492
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Val Cys Lys

<210> 493
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<220>
<223> C-term NH2

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Asp Thr His Phe Pro Cys Ile Ile Phe Glu Pro Arg Ser Lys Leu Trp
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Val Cys Lys

<210> 494
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<223> C-term NH2

<400> 494

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Val Cys Lys

<210> 495

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Lys

<210> 496

<211> 19

<212> PRT

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Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro His Ser Lys Glu Trp
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Val Cys Glu

<210> 497

<211> 19

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Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Trp
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Val Cys Lys

<210> 498
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<220>
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Val Cys Lys

<210> 499
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<220>
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<400> 499
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1 5 10 15

Val Cys Lys

<210> 500
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<223> C-term NH2

<400> 500
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Cys
1 5 10 15

Lys

<210> 501
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 501
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Ala Val Cys Tyr Trp
20

<210> 502
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 502
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro His Arg Ser Lys Gly
1 5 10 15

Trp Val Cys Met
20

<210> 503
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 503
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Ala Cys

<210> 504
<211> 19
<212> PRT
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<220>
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<220>
<223> N-term Hy

<220>
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<223> D-Cys

<220>
<221> MOD_RES
<222> (19)..(19)
<223> D-Cys

<220>
<223> C-term NH2

<400> 504
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
198

1 5 10 15

Val Ala Cys

<210> 505
<211> 20
<212> PRT
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<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 505
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Ala Cys Tyr
20

<210> 506
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 506
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly His
1 5 10 15

Val Cys Lys

<210> 507
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 507
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Asn Cys Lys

<210> 508
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 508
Asp Thr His Phe Pro Cys Ile Asn Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 509
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 509
Asp Thr His Phe Pro Cys Ile Asp Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 510
<211> 19
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<220>

<223> C-term NH2

<400> 510

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

Val Cys Lys

<210> 511

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

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<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 511

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

Trp Val Cys Lys
20

<210> 512

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

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<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 512

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

Trp Asn Cys Lys
20

<210> 513
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 513
Asp Thr His Phe Pro Cys Ile Ile Phe Gly Gly Pro Arg Ser Lys Gly
1 5 10 15

Trp Asp Cys Lys
20

<210> 514
<211> 17
<212> PRT
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<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 514
Asp Thr His Phe Pro Cys Ile Phe Glu Pro Arg Ser Lys Gly Thr Cys
1 5 10 15

Lys

<210> 515
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term PEG3-Cys-NH2

<400> 515
Asp Thr His Phe Pro Cys Ile Ile Phe
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<210> 516
<211> 19
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<220>
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<220>
<223> N-term Isovaleric acid

<220>
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<222> (10)..(10)
<223> Sarc

<220>
<223> C-term NH2

<400> 516
Asp Thr His Ala Pro Cys Ile Lys Phe Xaa Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys Lys

<210> 517
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
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<222> (15)..(15)
<223> Sarc

<220>
<223> C-term NH2

<400> 517
Asp Thr His Ala Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Xaa Trp
1 5 10 15

Glu Cys Lys

<210> 518
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 518
Asp Thr His Ala Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Trp
1 5 10 15

Glu Cys Lys

<210> 519
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 519
Ser Thr His Ala Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys Lys

<210> 520
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 520
Ser Lys His Ala Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Gly Trp
1 5 10 15

Glu Cys Lys

<210> 521
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 521
Asp Thr His phe Pro Cys Ile Lys Phe Glu Pro His Ser Lys Glu Trp
1 5 10 15

Val Cys Lys

<210> 522
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 522
Asp Thr Ala phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Cys
1 5 10 15

<210> 523
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 523
Asp Thr His phe Gly Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Trp
1 5 10 15

Val Cys Lys

<210> 524
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 524
Asp Thr Glu Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Trp
1 5 10 15

Val Cys Lys

<210> 525
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

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<222> (14)..(14)
<223> Lys(octanoic acid)

<220>
<223> C-term NH2

<400> 525
Asp Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Trp
1 5 10 15

Val Cys Lys

<210> 526
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 526
Glu Thr His Phe Pro Cys Ile Lys Phe Glu Pro Arg Ser Lys Glu Trp
1 5 10 15

Val Cys Lys

<210> 527
<211> 9
<212> PRT
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<220>
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<220>
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<222> (1)..(1)
<223> pGlu

<220>
<223> C-term NH2

<400> 527
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<210> 528
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 528
Asp Thr His Phe Pro Cys Leu Phe
1 5

<210> 529
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<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(Palm)

<220>
<223> C-term NH2

<400> 529
Asp Thr His Phe Pro Ile Cys Ile Phe Lys
1 5 10

<210> 530
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Lys(Palm)

<220>
<223> C-term NH2

<400> 530
Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 531
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 531
Asp Thr His Phe Pro Cys Ile Lys Phe Ala Ala
1 5 10

<210> 532
<211> 9
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (1)..(1)

<223> D-Phe

<220>

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<222> (2)..(2)

<223> D-Ile

<220>

<221> MOD_RES

<222> (3)..(3)

<223> D-Cys

<220>

<221> MOD_RES

<222> (4)..(4)

<223> D-Ile

<220>

<221> MOD_RES

<222> (5)..(5)

<223> D-Pro

<220>

<221> MOD_RES

<222> (6)..(6)

<223> D-Phe

<220>

<221> MOD_RES

<222> (7)..(7)

<223> D-His

<220>

<221> MOD_RES

<222> (8)..(8)

<223> D-Thr

<220>

<221> MOD_RES

<222> (9)..(9)

<223> D-Asp

<400> 532

Phe Ile Cys Ile Pro Phe His Thr Asp

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5

<210> 533

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 533
Asp Thr His Phe Pro Ile Cys Ile Phe
1 5

<210> 534
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
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<223> Ida

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Dpa

<220>
<221> MOD_RES
<222> (5)..(5)
<223> bhPro

<220>
<221> MOD_RES
<222> (9)..(9)
<223> bhPhe

<220>
<223> C-term PEG3-Palm

<400> 534
Xaa Thr His Xaa Pro Arg Cys Arg Phe
1 5

<210> 535
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (19)..(19)
<223> Lys(PEG8)

<220>
<223> C-term NH2

<400> 535
Asp Thr His Phe Pro Cys Ile Lys Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Lys

<210> 536
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(HO-isoGlu-Palm)

<220>
<223> C-term NH2

<400> 536
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Cys
1 5 10 15

Lys

<210> 537
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<221> MOD_RES
<222> (8)..(8)
<223> Lys(beta-Ala-Palm)

<220>
<223> C-term NH2

<400> 537
Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 538
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> C-term NH2

<400> 538
Asp Thr His Phe Pro Cys Ile Ile Phe
1 5

<210> 539
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isobutyric acid

<400> 539
Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 540
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<400> 540
Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 541
<211> 9
<212> PRT
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<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Cyclohexanoic acid

<400> 541
Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 542
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<400> 542

Asp Thr His Phe Pro Cys Ile Arg Phe
1 5

<210> 543

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<400> 543

Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 544

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Isovaleric acid

<400> 544

Asp Thr His Phe Pro Cys Ile Lys Phe
1 5

<210> 545

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<223> N-term Hy

<220>

<223> C-term NH2

<400> 545

Asp Thr His Phe Pro Ile Cys Ile Phe
1 5

<210> 546

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<221> MOD_RES
<222> (1)..(1)
<223> D-Phe

<220>
<221> MOD_RES
<222> (2)..(2)
<223> D-Ile

<220>
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<222> (3)..(3)
<223> D-Cys

<220>
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<222> (4)..(4)
<223> D-Ile

<220>
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<222> (5)..(5)
<223> D-Pro

<220>
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<222> (6)..(6)
<223> D-Phe

<220>
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<222> (7)..(7)
<223> D-His

<220>
<221> MOD_RES
<222> (8)..(8)
<223> D-Thr

<220>
<221> MOD_RES
<222> (9)..(9)
<223> D-Asp

<220>
<223> C-term NH2

<400> 546
Phe Ile Cys Ile Pro Phe His Thr Asp
1 5

<210> 547
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Hy

 <220>
 <223> C-term OH

 <400> 547
 Asp Thr His Phe Pro Ile Cys Ile Phe Cys Cys Gly Cys Cys His Arg
 1 5 10 15

 Ser Lys Cys Gly Met Cys Cys Lys Thr
 20 25

<210> 548
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
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<220>
 <223> N-term Palm-PEG11

<220>
 <221> MOD_RES
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<220>
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 <222> (2)..(2)
 <223> D-Ile

<220>
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 <222> (3)..(3)
 <223> D-Cys

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> D-Ile

<220>
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 <222> (5)..(5)
 <223> D-Pro

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 <222> (7)..(7)
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 <223> D-Thr

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<222> (9)..(9)
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<220>
<223> C-term NH2

<400> 548
Phe Ile Cys Ile Pro Phe His Thr Asp
1 5

<210> 549
<211> 19
<212> PRT
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<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> C-term NH2

<400> 549
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 550
<211> 18
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<220>
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<220>
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<222> (5)..(5)
<223> bhPro

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<223> bhPhe

<220>
<223> C-term NH2

<400> 550
Xaa Thr His Phe Pro Cys Arg Arg Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 551
<211> 18
<212> PRT
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<220>
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<220>
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<220>
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<223> bhAsp

<220>
<223> C-term NH2

<400> 551
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 552
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<221> MOD_RES
<222> (1)..(1)
<223> bhAsp

<220>
<221> MOD_RES
<222> (4)..(4)
<223> N-Me-Phe

<220>
<223> C-term NH2

<400> 552
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 553
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Ac

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(m-PEG8)

<220>
<223> C-term NH2

<400> 553
Asp Thr His Phe pro Ile Cys Ile Phe Lys Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 554
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Ac

<220>
<221> MOD_RES
<222> (14)..(14)
<223> Lys(m-PEG8)

<220>
<223> C-term NH2

<400> 554
Asp Thr His Phe pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys Met

<210> 555
<211> 19
<212> PRT
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
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<220>
<221> MOD_RES
<222> (4)..(4)
<223> Dpa

<220>
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<222> (5)..(5)
<223> bhPro

<220>
<223> C-term NH2

<400> 555
Xaa Thr His Xaa Pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly Trp
1 5 10 15

Val Cys Lys

<210> 556
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Hy

<220>
<223> C-term NH2

<400> 556
Ile Pro Phe Ile Asp Thr Cys Phe His Gly Pro Arg Ser Arg Gly Trp
1 5 10 15

Val Cys Lys

<210> 557
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 557
Asp Thr His Phe pro Cys Ile Ile Phe Gly Pro Arg Ser Lys Gly Val
1 5 10 15

Cys Lys

<210> 558
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
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peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 558
Asp Thr His Phe pro Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp Cys
1 5 10 15

Lys

<210> 559
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
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<220>
<223> C-term NH2

<400> 559
Asp Thr His Phe pro Cys Ile Ile Phe
1 5

<210> 560
<211> 18
<212> PRT
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<220>
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peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (14)..(14)
<223> Lys(m-PEG8)

<220>
<223> C-term NH2

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1 5 10 15

Val Cys

<210> 561
<211> 18
<212> PRT
<213> Artificial sequence

<220>
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peptide

<220>
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<220>
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<223> Lys(m-PEG4)

<220>
<223> C-term NH2

<400> 561
Asp Thr His Phe pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 562
<211> 19
<212> PRT
<213> Artificial sequence

<220>
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peptide

<220>
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<220>
<223> C-term NH2

<400> 562
Asp Thr His Phe pro Cys Ile Ile Phe Gly Pro Arg Ser Arg Gly Trp
1 5 10 15

Val Cys Lys

<210> 563
<211> 18
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<213> Artificial Sequence

<220>
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<220>
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<220>
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<222> (16)..(16)
<223> N-Me-Trp

<220>
<223> C-term NH2

<400> 563
Asp Thr His Phe Pro Ile Cys Ile Phe Gly Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 564
<211> 18
<212> PRT
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<220>
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<220>
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<220>
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<222> (10)..(10)
<223> Sarc

<220>
<221> MOD_RES
<222> (16)..(16)
<223> N-Me-Trp

<220>
<223> C-term NH2

<400> 564
Asp Thr His Phe Pro Ile Cys Ile Phe Xaa Pro Arg Ser Lys Gly Trp
1 5 10 15

Val Cys

<210> 565

<211> 18
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Sarc

<220>
<221> MOD_RES
<222> (16)..(16)
<223> N-Me-Trp

<220>
<223> C-term NH2

<400> 565
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1 5 10 15

Val Cys

<210> 566
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term NH2

<400> 566
Asp Thr His Phe Pro Cys Ile Ile Phe Glu Pro Arg Ser Lys Lys Trp
1 5 10 15

Val Cys Lys

<210> 567
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<223> C-term PEG3-Cys-NH2

<400> 567
Asp Thr His Phe Pro Cys Ile Ile Phe
1 5

<210> 568
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> C-term NH2

<400> 568
Asp Thr His Phe Pro Cys Ile Ile Phe
1 5

<210> 569
<211> 17
<212> PRT
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<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term Isovaleric acid

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys(Dapa-Palm)

<220>
<223> C-term NH2

<400> 569
Asp Thr His Phe Pro Cys Ile Lys Phe Lys Pro Arg Ser Lys Gly Cys
1 5 10 15

Lys

<210> 570
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
 <223> N-term Isovaleric acid

<400> 570
 Asp Thr His Phe Pro Cys Ile Lys Phe
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<210> 571
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
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 <222> (1)..(1)
 <223> Asp, Glu, Ida, pGlu, bhAsp or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe or Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro or bhPro

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Glu, Phe, Gln or Arg

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> May or may not be present

<400> 571
 Xaa Thr His Xaa Pro Cys Ile Xaa Phe Lys
 1 5 10

<210> 572
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
 <221> MOD_RES
 <222> (1)..(1)
 <223> Asp, Glu or Ida

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro or bhPro

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys or Phe

<400> 572
 Xaa Thr His Phe Pro Cys Ile Xaa Phe
 1 5

<210> 573
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

<220>
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 <223> Gly, Ala, Lys, Pro or D-Pro

<220>
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 <222> (2)..(2)
 <223> Pro, Ala or Gly

<220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> Arg, Ala, Lys or Trp

<220>
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 <222> (4)..(4)
 <223> Ser, Gly or Ala

<220>
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 <222> (5)..(5)
 <223> Lys, Met, Arg or Ala

<220>
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 <222> (6)..(6)
 <223> Gly, Arg or Ala

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Trp, Ala or absent

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Val, Thr, Lys, Ala, Glu or absent

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Met, Lys or absent

<400> 573
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa
 1 5 10

<210> 574
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<221> MOD_RES
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<223> Gly, Pro or D-Pro

<220>
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<223> Pro or Gly

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Arg or Lys

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Val or Thr

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Met, Lys or absent

<400> 574
Xaa Xaa Xaa Ser Lys Gly Trp Xaa Cys Xaa
1 5 10

<210> 575
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
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<222> (1)..(1)
<223> Val, Ala or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Gly, Pro or absent

<220>
<221> MOD_RES
<222> (4)..(4)
<223> His, Trp or Tyr

<220>
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<222> (6)..(6)
 <223> Ser, Gly or Pro

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 <221> MOD_RES
 <222> (7)..(7)
 <223> Ile, Gly or Lys

 <220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Gly, Met or absent

 <220>
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 <223> Tyr or Cys

 <220>
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 <223> Arg, Lys, Met or Ala

 <220>
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 <223> Arg or Ala

 <220>
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 <222> (13)..(13)
 <223> Cys, Val or absent

 <220>
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 <222> (14)..(14)
 <223> Cys, Lys, Pro, Arg, Thr or absent

 <220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Arg, Thr or absent

 <400> 575
 Xaa Cys Xaa Xaa Arg Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

 <210> 576
 <211> 10
 <212> PRT
 <213> Artificial Sequence

 <220>
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 <220>
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 <222> (3)..(3)
 <223> Arg or Lys

 <220>

<221> MOD_RES
<222> (5)..(5)
<223> Arg or Lys

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<220>
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<222> (7)..(7)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Val, Thr, Asp, Glu or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> May or may not be present

<400> 576
Xaa Pro Xaa Ser Xaa Xaa Trp Xaa Cys Lys
1 5 10

<210> 577
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<223> Glu or Lys

<220>
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<223> Arg or Lys

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<223> Arg or Lys

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Gly, Ser, Lys, Ile or Arg

<220>
<221> MOD_RES
<222> (7)..(7)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (8)..(8)
<223> May or may not be present

<220>
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 <222> (10)..(10)
 <223> May or may not be present

 <400> 577
 Xaa Pro Xaa Ser Xaa Xaa Trp Val Cys Lys
 1 5 10

<210> 578
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
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 <222> (1)..(1)
 <223> Asp, pGlu, bhAsp or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe or Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro or bhPro

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Ile, Cys or Arg

<220>
 <221> MOD_RES
 <222> (7)..(7)
 <223> Cys, Ile, Leu or Val

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Glu, Phe, Gln or Arg

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> May or may not be present

<400> 578
 Xaa Thr His Xaa Pro Xaa Xaa Xaa Phe Lys
 1 5 10

<210> 579
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic polypeptide

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<222> (1)..(1)
<223> Asp, Ida, pGlu, bhAsp or absent

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe or Dpa

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro or bhPro

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ile, Lys, Glu, Phe, Gln or Arg

<220>
<221> MOD_RES
<222> (10)..(10)
<223> May or may not be present

<400> 579
Xaa Thr His Xaa Pro Cys Ile Xaa Phe Lys
1 5 10

<210> 580
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

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<223> Asp, Glu or Ida

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro or bhPro

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ile, Lys or Phe

<400> 580
Xaa Thr His Phe Pro Cys Ile Xaa Phe
1 5

<210> 581
<211> 10
<212> PRT
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<220>
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 <223> Gly, Ala, Lys, Pro or D-Pro

<220>
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 <223> Pro, Ala or Gly

<220>
 <221> MOD_RES
 <222> (3)..(3)
 <223> Arg, Ala, Lys or Trp

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Ser, Gly or Ala

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Lys, Met, Arg or Ala

<220>
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 <222> (6)..(6)
 <223> Gly, Arg or Ala

<220>
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 <222> (7)..(7)
 <223> Trp or Ala

<220>
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 <222> (8)..(8)
 <223> Val, Thr, Ala or Glu

<220>
 <221> MOD_RES
 <222> (10)..(10)
 <223> Met, Lys or absent

<400> 581
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa
 1 5 10

<210> 582
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic peptide

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 <223> Gly, Pro or D-Pro

<220>
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<222> (2)..(2)
<223> Pro or Gly

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Arg or Lys

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Val or Thr

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Met, Lys or absent

<400> 582
Xaa Xaa Xaa Ser Lys Gly Trp Xaa Cys Xaa
1 5 10

<210> 583
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<223> Val, Ala or absent

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Gly, Pro or absent

<220>
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<222> (4)..(4)
<223> His, Trp or Tyr

<220>
<221> MOD_RES
<222> (6)..(6)
<223> Ser, Gly or Pro

<220>
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<222> (7)..(7)
<223> Ile, Gly or Lys

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Gly, Met or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Tyr or Cys

<220>

<221> MOD_RES
 <222> (11)..(11)
 <223> Arg, Lys, Met or Ala

<220>
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 <222> (12)..(12)
 <223> Arg or Ala

<220>
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 <222> (13)..(13)
 <223> Cys, Val or absent

<220>
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 <222> (14)..(14)
 <223> Cys, Lys, Pro, Arg, Thr or absent

<220>
 <221> MOD_RES
 <222> (15)..(15)
 <223> Arg, Thr or absent

<400> 583
 Xaa Cys Xaa Xaa Arg Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

<210> 584
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
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 <223> Asp, Ida, pGlu, bhAsp or absent

<220>
 <221> MOD_RES
 <222> (4)..(4)
 <223> Phe or Dpa

<220>
 <221> MOD_RES
 <222> (5)..(5)
 <223> Pro or bhPro

<220>
 <221> MOD_RES
 <222> (6)..(6)
 <223> Ile, Cys or Arg

<220>
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 <222> (7)..(7)
 <223> Cys, Ile, Leu or Val

<220>
 <221> MOD_RES
 <222> (8)..(8)
 <223> Ile, Lys, Glu, Phe, Gln or Arg

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Lys, Phe or absent

<400> 584
Xaa Thr His xaa Pro Xaa Xaa Xaa Phe Xaa
1 5 10

<210> 585
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<223> Asp, Ida, pGlu, bhAsp or absent

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Phe or Dpa

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro or bhPro

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ile, Lys, Glu, Phe, Gln or Arg

<220>
<221> MOD_RES
<222> (10)..(10)
<223> May or may not be present

<400> 585
Xaa Thr His xaa Pro Cys Ile Xaa Phe Lys
1 5 10

<210> 586
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<221> MOD_RES
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<223> Asp, Glu or Ida

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Pro or bhPro

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ile, Lys or Phe

<400> 586
Xaa Thr His Phe Pro Cys Ile Xaa Phe
1 5

<210> 587
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<223> Gly, Ala, Lys, Pro or D-Pro

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Pro, Ala or Gly

<220>
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<222> (3)..(3)
<223> Arg, Ala, Lys or Trp

<220>
<221> MOD_RES
<222> (4)..(4)
<223> Ser, Gly or Ala

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Lys, Met, Arg or Ala

<220>
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<222> (6)..(6)
<223> Gly, Arg or Ala

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Trp, Ala or absent

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Val, Thr, Lys, Ala, Glu or absent

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Met, Lys or absent

<400> 587
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa
1 5 10

<210> 588
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<222> (1)..(1)
<223> Gly, Pro or D-Pro

<220>
<221> MOD_RES
<222> (2)..(2)
<223> Pro or Gly

<220>
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<222> (3)..(3)
<223> Arg or Lys

<220>
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<222> (8)..(8)
<223> Val or Thr

<220>
<221> MOD_RES
<222> (10)..(10)
<223> Met, Lys or absent

<400> 588
Xaa Xaa Xaa Ser Lys Gly Trp Xaa Cys Xaa
1 5 10

<210> 589
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 589
Asp Thr His Phe Pro Ile Cys Ile
1 5

<210> 590
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<222> (3)..(3)

<223> Any amino acid

<400> 590

Asp Thr Xaa Phe Pro Cys
1 5

<210> 591

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (3)..(3)

<223> Any amino acid

<220>

<221> MOD_RES

<222> (7)..(7)

<223> Any amino acid

<220>

<221> MOD_RES

<222> (8)..(8)

<223> Any amino acid or absent

<400> 591

Asp Thr Xaa Phe Pro Cys Xaa Xaa Phe
1 5

<210> 592

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD_RES

<222> (1)..(3)

<223> Any amino acid or absent

<220>

<221> MOD_RES

<222> (5)..(5)

<223> Any amino acid

<220>

<221> MOD_RES

<222> (7)..(7)

<223> Any amino acid except for D-Cys, D-Ser, D-Ala, Cys(S-tBut), homoC, Pen, (D)Pen, Dap(AcBr), Inp or D-His

<220>

<221> MOD_RES

<222> (8)..(8)

<223> Any amino acid

<400> 592

Xaa Xaa Xaa Phe Xaa Cys Xaa Xaa Phe
1 5

<210> 593
<211> 9
<212> PRT
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<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
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<222> (3)..(3)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Any amino acid or absent

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<220>
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<222> (8)..(8)
<223> Any amino acid

<400> 593
Asp Thr Xaa Phe Xaa Cys Xaa Xaa Phe
1 5

<210> 594
<211> 7
<212> PRT
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<220>
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<222> (3)..(3)
<223> Any amino acid

<220>
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<222> (6)..(6)
<223> Any amino acid

<400> 594
Asp Thr Xaa Phe Pro Xaa Cys
1 5

<210> 595
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<212> PRT
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<220>
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<220>
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<223> Any amino acid

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<221> MOD_RES
<222> (6)..(6)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Any amino acid or absent

<400> 595
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1 5

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Val Cys Lys

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1				5					10