

CLAIMS

1. A peptide comprising or consisting of the amino acid sequence of:

TSFXaa₁EYWXaa₃LLXaa₂

wherein

Xaa₁ is (R)-2-(7'-octenyl)alanine or derivative thereof, or is (R)-2-(4'-pentenyl)alanine or derivative thereof; and

Xaa₂ and Xaa₃ are independently any type of amino acid or modified amino acid.

2. The peptide of claim 1, wherein Xaa₃ is A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine, and/or

wherein Xaa₂ is S, or P, or (S)-2-(4'-pentenyl)alanine or a derivative of (S)-2-(4'-pentenyl)alanine.

3. The peptide of any of the preceding claims, wherein the peptide further comprises a sequence comprising the amino acids –ENXaa₅ bound to its C-terminus, resulting in

TSFXaa₁EYW Xaa₃LLXaa₂ENXaa₅

wherein Xaa₅ is F or Y.

4. A peptide comprising or consisting of the amino acid sequence of:

TSFXaa₁EYW Xaa₃LLXaa₂ENXaa₅

wherein

Xaa₁ and Xaa₃ are any type of amino acid or modified amino acid;

Xaa₂ is S, or P, or (S)-2-(4'-pentenyl)alanine or a derivative of (S)-2-(4'-pentenyl)alanine; and

wherein Xaa₅ is F or Y.

5. The peptide of claim 4, wherein Xaa₃ is N, or A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine; and wherein if Xaa₃ is N, Xaa₁ is not A and/or Xaa₂ is not S, and/or

wherein Xaa₁ is (R)-2-(7'-octenyl)alanine or derivative thereof, or is (R)-2-(4'-pentenyl)alanine or derivative thereof; optionally

wherein Xaa₃ is A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine.

6. A peptide comprising or consisting of the amino acid sequence of:

5 TSFXaa₁EYW Xaa₃LLXaa₂ENXaa₅

wherein

Xaa₁ and Xaa₃ are any type of amino acid or modified amino acid;

Xaa₂ is S, or P, or (S)-2-(4'-pentenyl)alanine or a derivative of (S)-2-(4'-pentenyl)alanine; and

10 wherein Xaa₅ is F or Y.

7. The peptide of claim 6, wherein Xaa₃ is N, or A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine; and wherein if Xaa₃ is N, Xaa₁ is not A and/or Xaa₂ is not S, and/or

15 wherein Xaa₁ is (R)-2-(7'-octenyl)alanine or derivative thereof, or is (R)-2-(4'-pentenyl)alanine or derivative thereof; optionally
wherein Xaa₃ is A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine.

- 20 8. A peptide comprising or consisting of the amino acid sequence of:

TSFXaa₁EYW Xaa₃LLXaa₂

wherein Xaa₁, Xaa₂ and Xaa₃ are independently selected from any type of amino acid or modified amino acid; and

25 wherein the N-terminus of the peptide is bound to a linker that results in a molecule not perturbing cell membrane integrity.

9. The peptide of claim 8, wherein Xaa₁ is (R)-2-(7'-octenyl)alanine or derivative thereof, or is (R)-2-(4'-pentenyl)alanine or derivative thereof; and/or,
wherein Xaa₂ is S, or P, or (S)-2-(4'-pentenyl)alanine or a derivative of (S)-2-(4'-pentenyl)alanine; and/or,

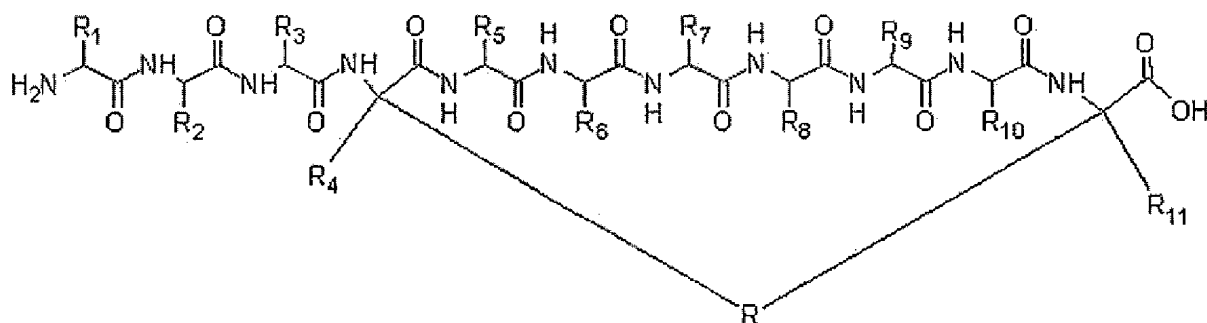
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wherein Xaa₃ is N, or A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine; and wherein if Xaa₃ is N, Xaa₁ is not A and/or Xaa₂ is not S; optionally,

wherein Xaa₃ is A, or (R)-2-(4'-pentenyl)alanine or a derivative of (R)-2-(4'-pentenyl)alanine.

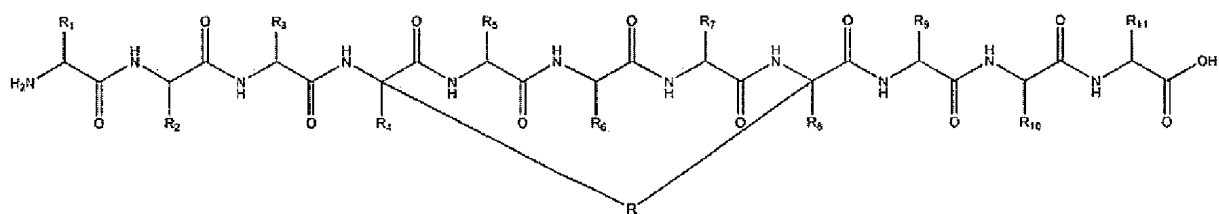
10. The peptide of claims 1 to 9, wherein the peptide is a cross-linked peptide with a cross-linker to connect a first amino acid Xaa₁ to a second amino acid Xaa₂; or wherein the peptide is a cross-linked peptide with a cross-linker to connect a first amino acid Xaa₁ to a second amino acid Xaa₃

11. The peptide of claim 1, wherein the peptide comprises the formula:



or

- the peptide of claim 4, wherein the peptide comprises the formula:



wherein:

R₁ is -C(OH)CH₃ [T];

R₂ is -CH₂OH [S];

R₃ is benzyl [F];

R₄ and R₁₁ are independently H or a C₁ to C₁₀ alkyl, alkenyl, alkynyl, arylalkyl, cycloalkylalkyl, heteroarylalkyl, or heterocyclalkyl;

R₅ is -(CH₂)₂C(O)OH [E];

R₆ is -CH₂-Phenyl-OH [Y];

R_7 is the side chain of Trp, wherein C_6 of Trp is substituted with a hydrogen or a halogen and/or wherein Trp is independently an L or D optical isomer;

R_8 is the side chain of any amino acid;

R_9 and R_{10} are $-\text{CH}_2\text{CH}(\text{CH}_3)_2$ [L];

5 R is alkyl, alkenyl, alkynyl; $[\text{R}'-\text{B}-\text{R}']_n$; each of which is substituted with 0-6 R_{12} ;

R' and R'' are independently alkylene, alkenylene or alkynylene;

each R_{12} is independently halo, alkyl, OR_{13} , $\text{N}(\text{R}_{13})_2$, SR_{13} , SOR_{13} , SO_2R_{13} , CO_2R_{13} , R_{13} , a fluorescent moiety, or a radioisotope;

B is independently O, S, SO, SO_2 , CO, CO_2 , CONR_{13} or ;

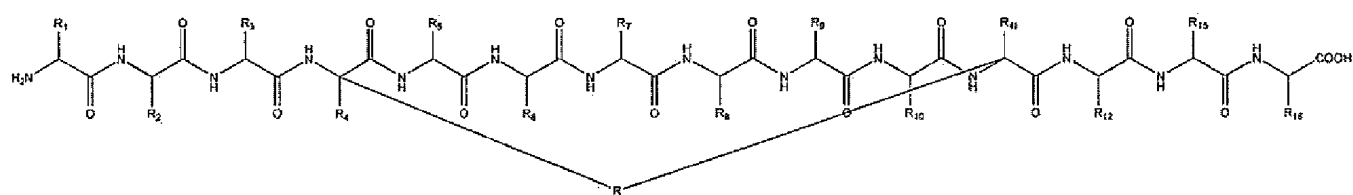
10 each R_{13} is independently H, alkyl, or a therapeutic agent;

n is an integer from 1-4.

12. The peptide according to claim 11, wherein R_4 and R_{11} are independently H or $\text{C}_1\text{-C}_6$ alkyl, and/or

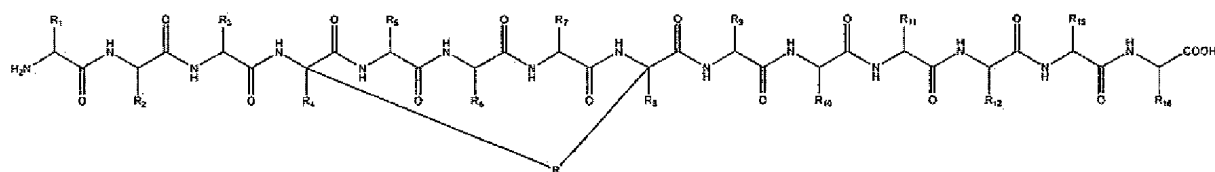
15 wherein R is selected from the group consisting of C_8 alkyl, C_{11} alkyl, alkenyl, C_8 alkenyl, C_{11} alkenyl, linear chain alkyl, alkenyl and alkynyl; and/or
wherein R_1 , R_2 , R_3 , R_5 , R_6 , R_7 , R_8 , R_9 , R_{10} are as defined in claim 13; wherein R_4 and R_{11} are H; and wherein R is C_{11} alkenyl.

20 13. The peptide of claim 12, wherein the peptide comprises the formula:



or

the peptide of claim 12, wherein the peptide comprises the formula:



25 wherein:

R_1 is $-\text{C}(\text{OH})\text{CH}_3$ [T];

R_2 is $-\text{CH}_2\text{OH}$ [S];

R₃ is benzyl [F];

R₄ and R₁₁ are independently H or a C₁ to C₁₀ alkyl, alkenyl, alkynyl, arylalkyl, cycloalkylalkyl, heteroarylalkyl, or heterocyclylalkyl;

R₅ is –(CH₂)₂C(O)OH [E];

5 R₆ is –CH₂-Phenyl-OH [Y];

R₇ is the side chain of Trp, wherein C₆ of Trp is substituted with a hydrogen or a halogen and/or wherein Trp is independently an L or D optical isomer;

R₈ is independently the side chain of any amino acid;

R₉ and R₁₀ are –CH₂CH(CH₃)₂ [L];

10 R is alkyl, alkenyl, alkynyl; [R'–B–R'']_n; each of which is substituted with 0-6 R₁₃;

R' and R'' are independently alkylene, alkenylene or alkynylene;

each R₁₃ is independently halo, alkyl, OR₁₄, N(R₁₄)₂, SR₁₄, SOR₁₄, SO₂R₁₄, CO₂R₁₄, R₁₄, a fluorescent moiety, or a radioisotope;

B is independently O, S, SO, SO₂, CO, CO₂, CONR₁₄ or ;

15 each R₁₄ is independently H, alkyl, or a therapeutic agent;

n is an integer from 1-4;

R₁₂ is –(CH₂)₂C(O)OH [E];

R₁₅ is –CH₂C(O)NH₂ [N];

R₁₆ is independently either benzyl [F] or –CH₂-Phenyl-OH [Y].

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14. The peptide according to claim 13, wherein R₄ and R₁₁ are independently H or C₁-C₆ alkyl; and/or

wherein R is selected from the group consisting of C₈ alkyl, C₁₁ alkyl, alkenyl, C₈ alkenyl, C₁₁ alkenyl, linear chain alkyl, alkenyl and alkynyl; and/or

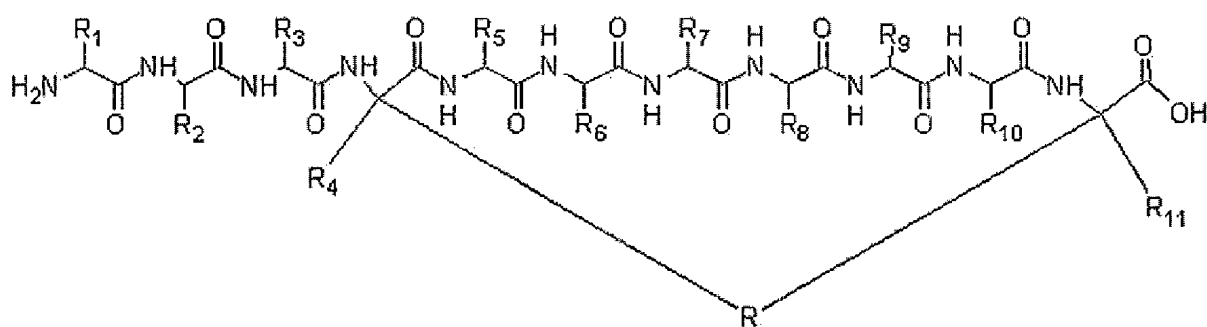
25 wherein R₁, R₂, R₃, R₅, R₆, R₇, R₈, R₉, R₁₀ are as defined in claim 6; wherein R₄ and R₁₁ are H; and wherein R is C₁₁ alkenyl.

15. The peptide of any of claims 8 to 10, wherein the peptide further comprises a sequence comprising the amino acids –ENXaa₅ bound to its C-terminus, resulting in

30 TSFXaa₁EYW Xaa₃LLXaa₂ENXaa₅

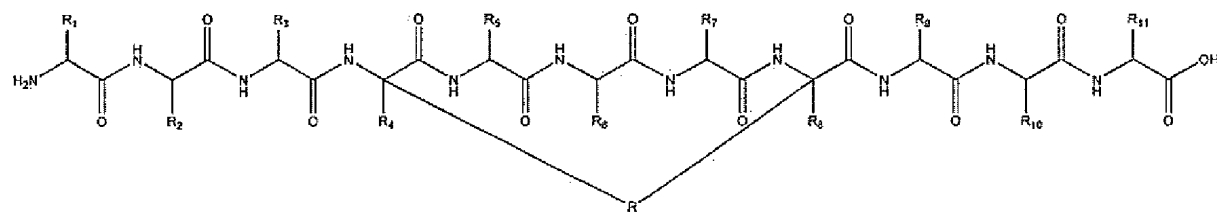
wherein Xaa₅ is F or Y; optionally,

wherein the peptide comprises the formula:



or

the peptide of claim 10, wherein the peptide comprises the formula:



5 wherein:

R_1 is $-\text{C}(\text{OH})\text{CH}_3$ [T];

R_2 is $-\text{CH}_2\text{OH}$ [S];

R_3 is benzyl [F];

10 R_4 and R_{11} are independently H or a C_1 to C_{10} alkyl, alkenyl, alkynyl, arylalkyl, cycloalkylalkyl, heteroarylalkyl, or heterocyclalkyl;

R_5 is $-(\text{CH}_2)_2\text{C}(\text{O})\text{OH}$ [E];

R_6 is $-\text{CH}_2\text{-Phenyl-OH}$ [Y];

R_7 is the side chain of Trp, wherein C_6 of Trp is substituted with a hydrogen or a halogen and/or wherein Trp is independently an L or D optical isomer;

15 R_8 is the side chain of any amino acid;

R_9 and R_{10} are $-\text{CH}_2\text{CH}(\text{CH}_3)_2$ [L];

R is alkyl, alkenyl, alkynyl; $[\text{R}'\text{-B-R}']_n$; each of which is substituted with 0-6 R_{12} ;

R' and R'' are independently alkylene, alkenylene or alkynylene;

20 each R_{12} is independently halo, alkyl, OR_{13} , $\text{N}(\text{R}_{13})_2$, SR_{13} , SOR_{13} , SO_2R_{13} , CO_2R_{13} , R_{13} , a fluorescent moiety, or a radioisotope;

B is independently O, S, SO, SO_2 , CO, CO_2 , CONR_{13} or ;

each R_{13} is independently H, alkyl, or a therapeutic agent;

n is an integer from 1-4.

16. The peptide according to claim 15, wherein R_4 and R_{11} are independently H or C_1 - C_6 alkyl; and/or,
wherein R is selected from the group consisting of C_8 alkyl C_{11} alkyl, alkenyl, C_{11} alkenyl, C_8 alkenyl, a linear chain alkyl, alkenyl and alkynyl; and/or,
5 wherein R_1 , R_2 , R_3 , R_5 , R_6 , R_7 , R_8 , R_9 , R_{10} are as defined in claim 13; wherein R_4 and R_{11} are H; and wherein R is C_{11} alkenyl.
17. The peptide of any of the preceding claims, wherein the peptide comprises a sequence
10 selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9 and SEQ ID NO: 10.
18. A pharmaceutical composition comprising a peptide according to any of claims 1 to 17.
- 15 19. The pharmaceutical composition according to claim 18, wherein the pharmaceutical composition comprises a further therapeutic compound; optionally wherein the further therapeutic compound is an apoptosis promoting compound.
- 20 20. Use of a peptide of any one of claims 1 to 17 in the manufacture of a medicament for treating or preventing cancer in a patient.