Claims

1. Use of:

(a) a Solanaceous Class II plant defensin;

(b) a nucleic acid encoding the Solanaceous Class II plant defensin;

(c) a vector comprising the nucleic acid of (b);

(d) a host cell comprising the vector of (c); or

(e) an expression product produced by the vector of (c);

in the preparation of a medicament for preventing or treating a proliferative disease.

~~2. The use according to claim 1~~, wherein the plant defensin is derived or derivable from the genus *Nicotiana*~~, *Petunia* or *Solanum*~~.

~~3~~2. The use according to claim 1, wherein the plant defensin is derived or derivable from *Nicotiana alata*~~,~~ or *Nicotiana suaveolens*~~, *Petunia hybrida* or *Solanum lycopersicum*~~.

~~4~~3. The use according to claim 1, wherein the plant defensin is selected from the group comprising NaD1, NsD1~~,~~ or NsD2~~, PhD1A and TPP3~~.

~~5~~4. The use according to claim 1, wherein the plant defensin comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, ~~SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, or SEQ ID NO: 18,~~ SEQ ID NO: 20, SEQ ID NO: 22, SEQ ID NO: 24 or SEQ ID NO: 26 or a functional fragment thereof.

~~6~~5. The use according to claim 1, wherein the plant defensin is encoded by a nucleic acid sequence selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, ~~SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15 or SEQ ID NO: 17, SEQ ID NO: 19,~~ SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25 or SEQ ID NO: 27 or a functional fragment or complement thereof, or a functional nucleic acid sequence that is 70% identical to any of the aforementioned nucleic acid sequences.

~~7~~6. The use according to any one of claims 1 to 6, wherein the proliferative disease is cancer.

87. The use according to claim 7 6 wherein the cancer is selected from the group comprising basal cell carcinoma, bone cancer, bowel cancer, brain cancer, breast cancer, cervical cancer, leukemia, liver cancer, lung cancer, lymphoma, melanoma, ovarian cancer, pancreatic cancer, prostate cancer or thyroid cancer.

98. A kit for preventing or treating a proliferative disease, wherein the kit comprises a therapeutically effective amount of:

(a) a Solanaceous Class II plant defensin;

(b) a nucleic acid encoding the Solanaceous Class II plant defensin;

(c) a vector comprising the nucleic acid;

(d) a host cell comprising the vector;

(e) an expression product produced by the vector; or

(f) a pharmaceutical composition comprising the plant defensin, the nucleic acid, the vector, the host cell or the expression product, together with a pharmaceutically acceptable carrier, diluent or excipient.

10. The kit according to claim 9, wherein the plant defensin is derived or derivable from the genus *Nicotiana, Petunia or Solanum*.

119. The kit according to claim 98, wherein the plant defensin is derived or derivable from *Nicotiana alata,* or *Nicotiana suaveolens, Petunia hybrida or Solanum lycopersicum*.

1210. The kit according to claim 98, wherein the plant defensin is selected from the group comprising NaD1, NsD1, or NsD2, PhD1A and TPP3.

1311. The kit according to claim 98, wherein the plant defensin comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, or SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, SEQ ID NO: 24 or SEQ ID NO: 26 or a functional fragment thereof.

1412. The kit according to claim 98, wherein the plant defensin is encoded by a nucleic acid sequence selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO:

~~15 or SEQ ID NO: 17, SEQ ID NO: 19,~~ SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25 or SEQ ID NO: 27 or a functional fragment or complement thereof, or a functional nucleic acid sequence that is 70% identical to any of the aforementioned nucleic acid sequences.

~~15~~13. The kit according to any one of claims ~~9~~ 8 to ~~14~~12, wherein the proliferative disease is cancer.

~~16~~14. The kit according to claim ~~15~~ 13 wherein the cancer is selected from the group comprising basal cell carcinoma, bone cancer, bowel cancer, brain cancer, breast cancer, cervical cancer, leukemia, liver cancer, lung cancer, lymphoma, melanoma, ovarian cancer, pancreatic cancer, prostate cancer or thyroid cancer.

~~17~~15. Use of the kit according to any one of claims ~~9~~ 8 to ~~16~~ 14 for preventing or treating a proliferative disease, wherein the therapeutically effective amount of:

(a) the Solanaceous Class II plant defensin;

(b) the nucleic acid encoding the Solanaceous Class II plant defensin;

(c) the vector comprising the nucleic acid;

(d) the host cell comprising the vector;

(e) the expression product produced by the vector; or

(f) the pharmaceutical composition comprising the plant defensin, the nucleic acid, the vector, the host cell or the expression product, together with a pharmaceutically acceptable carrier, diluent or excipient;

is administered to a subject, thereby preventing or treating the proliferative disease.

~~18~~16. A pharmaceutical composition for preventing or treating a proliferative disease, wherein the pharmaceutical composition comprises:

(a) a Solanaceous Class II plant defensin;

(b) a nucleic acid encoding the Solanaceous Class II plant defensin;

(c) a vector comprising the nucleic acid;

(d) a host cell comprising the vector; or

(e) an expression product produced by the vector;

together with a pharmaceutically acceptable carrier, diluent or excipient

wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

~~19~~17. A Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

~~20~~18. A nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

~~21~~19. A vector comprising a nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

~~22~~20. A host cell comprising a vector comprising a nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

~~23~~21. An expression product produced by a vector comprising a nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

~~24. A method for screening for cytotoxicity of a Solanaceous Class II plant defensin against mammalian tumour cells, wherein the Solanaceous Class II plant defensin is not derived or derivable from *Capsicum chinense*, wherein the method comprises contacting:~~

~~(a) a Solanaceous Class II plant defensin;~~

~~(b) a nucleic acid encoding the Solanaceous Class II plant defensin;~~

~~(c) a vector comprising the nucleic acid;~~

~~(d) a host cell comprising the vector; or~~

~~(e) an expression product produced by the vector.~~

~~with a mammalian cell line, and assaying for cytoxicity against the mammalian cell line due to contact with the plant defensin, thereby screening for cytotoxicity of the Solanaceous Class II plant defensin against mammalian tumour cells.~~

~~25~~22. A method for producing a Solanaceous Class II plant defensin with reduced haemolytic activity, wherein the method comprises introducing into the plant defensin at least one alanine residue at or near the N-terminal of the defensin, wherein the

plant defensin is derived or derivable from the genus *Nicotiana*, and wherein the plant defensin is for preventing or treating a proliferative disease.

Claims

1. Use of:

(a) a Solanaceous Class II plant defensin;

(b) a nucleic acid encoding the Solanaceous Class II plant defensin;

(c) a vector comprising the nucleic acid of (b);

(d) a host cell comprising the vector of (c); or

(e) an expression product produced by the vector of (c);

in the preparation of a medicament for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana.*

2. The use according to claim 1, wherein the plant defensin is derived or derivable from *Nicotiana alata* or *Nicotiana suaveolens.*

3. The use according to claim 1, wherein the plant defensin is selected from the group comprising NaD1, NsD1 or NsD2.

4. The use according to claim 1, wherein the plant defensin comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 20, SEQ ID NO: 22, SEQ ID NO: 24 or SEQ ID NO: 26 or a functional fragment thereof.

5. The use according to claim 1, wherein the plant defensin is encoded by a nucleic acid sequence selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25 or SEQ ID NO: 27 or a functional fragment or complement thereof, or a functional nucleic acid sequence that is 70% identical to any of the aforementioned nucleic acid sequences.

6. The use according to any one of claims 1 to 6, wherein the proliferative disease is cancer.

7. The use according to claim 6 wherein the cancer is selected from the group comprising basal cell carcinoma, bone cancer, bowel cancer, brain cancer, breast cancer, cervical cancer, leukemia, liver cancer, lung cancer, lymphoma, melanoma, ovarian cancer, pancreatic cancer, prostate cancer or thyroid cancer.

8. A kit for preventing or treating a proliferative disease, wherein the kit comprises a therapeutically effective amount of:

(a) a Solanaceous Class II plant defensin;

(b) a nucleic acid encoding the Solanaceous Class II plant defensin;

(c) a vector comprising the nucleic acid;

(d) a host cell comprising the vector;

(e) an expression product produced by the vector; or

(f) a pharmaceutical composition comprising the plant defensin, the nucleic acid, the vector, the host cell or the expression product, together with a pharmaceutically acceptable carrier, diluent or excipient, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

9. The kit according to claim 8, wherein the plant defensin is derived or derivable from *Nicotiana alata* or *Nicotiana suaveolens*.

10. The kit according to claim 8, wherein the plant defensin is selected from the group comprising NaD1, NsD1 or NsD2.

11. The kit according to claim 8, wherein the plant defensin comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 20, SEQ ID NO: 22, SEQ ID NO: 24 or SEQ ID NO: 26 or a functional fragment thereof.

12. The kit according to claim 8, wherein the plant defensin is encoded by a nucleic acid sequence selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25 or SEQ ID NO: 27 or a functional fragment or complement thereof, or a functional nucleic acid sequence that is 70% identical to any of the aforementioned nucleic acid sequences.

13. The kit according to any one of claims 8 to 12, wherein the proliferative disease is cancer.

14. The kit according to claim 13 wherein the cancer is selected from the group comprising basal cell carcinoma, bone cancer, bowel cancer, brain cancer, breast cancer, cervical cancer, leukemia, liver cancer, lung cancer, lymphoma, melanoma, ovarian cancer, pancreatic cancer, prostate cancer or thyroid cancer.

15. Use of the kit according to any one of claims 8 to 14 for preventing or treating a proliferative disease, wherein the therapeutically effective amount of:

(a) the Solanaceous Class II plant defensin;

(b) the nucleic acid encoding the Solanaceous Class II plant defensin;

(c) the vector comprising the nucleic acid;

(d) the host cell comprising the vector;

(e) the expression product produced by the vector; or

(f) the pharmaceutical composition comprising the plant defensin, the nucleic acid, the vector, the host cell or the expression product, together with a pharmaceutically acceptable carrier, diluent or excipient;

is administered to a subject, thereby preventing or treating the proliferative disease.

16. A pharmaceutical composition for preventing or treating a proliferative disease, wherein the pharmaceutical composition comprises:

(a) a Solanaceous Class II plant defensin;

(b) a nucleic acid encoding the Solanaceous Class II plant defensin;

(c) a vector comprising the nucleic acid;

(d) a host cell comprising the vector; or

(e) an expression product produced by the vector;

together with a pharmaceutically acceptable carrier, diluent or excipient wherein the plant defensin is derived or derivable from the genus *Nicotiana.*

17. A Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana.*

18. A nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

19. A vector comprising a nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

20. A host cell comprising a vector comprising a nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

21. An expression product produced by a vector comprising a nucleic acid encoding a Solanaceous Class II plant defensin for preventing or treating a proliferative disease, wherein the plant defensin is derived or derivable from the genus *Nicotiana*.

22. A method for producing a Solanaceous Class II plant defensin with reduced haemolytic activity, wherein the method comprises introducing into the plant defensin at least one alanine residue at or near the N-terminal of the defensin, wherein the plant defensin is derived or derivable from the genus *Nicotiana*, and wherein the plant defensin is for preventing or treating a proliferative disease.