

We Claim:

1. A modified lectin protein, wherein the modified lectin protein comprises an amino acid sequence selected from any one of:
 - i) SEQ ID NO. 1; or
 - ii) an amino acid sequence having at least 760% identity homology to i),wherein the amino acid sequence of i) or ii) is selected from ~~comprises at least one amino acid modification selected from one of more of the following (a) to (d):~~
 - ~~a) at least one amino acid modification in a carbohydrate binding site of i) or ii); or~~
 - ~~b) at least one amino acid modification in an N-terminus of i) or ii);~~
 - ~~c) at least one amino acid modification at position 76; or~~
 - ~~d) at least one amino acid modification at position 44 or 89,~~wherein the modified lectin protein does not consist of the amino acid sequence of any of SEQ ID NOS. 2 to 4; SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:17, SEQ ID NO:41; SEQ ID NO:44, SEQ ID NO:56, SEQ ID NO:59; SEQ ID NO:62; SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:71, SEQ ID NO:74, SEQ ID NO:80, SEQ ID NO:83, SEQ ID NO:86, SEQ ID NO:92, SEQ ID NO:95, SEQ ID NO:101, SEQ ID NO:104, SEQ ID NO:107, SEQ ID NO:110, SEQ ID NO:116, SEQ ID NO:119, and SEQ ID NO:134.
2. ~~The modified lectin protein as claimed in claim 1, wherein the modified lectin protein comprises an amino acid sequence having at least 70%, 80%, 90%, 95%, 97% or 99% homology to SEQ ID NO. 1.~~
3. ~~The modified lectin protein as claimed in claim 1, wherein the modified lectin protein comprises at least one amino acid modification in a carbohydrate binding site of i) or ii).~~
4. ~~The modified lectin protein as claimed in claim 3, wherein the carbohydrate binding site is a primary and/or a secondary carbohydrate binding site.~~
5. ~~The modified lectin protein as claimed in claim 4, wherein the primary carbohydrate binding site comprises a position selected from one or more of: 27, 28, 47, 48, 70, 71, 72 and 105 in SEQ ID NO. 1 or a corresponding position in a sequence having at least 60%, 70%, 80%, 90%, 95%, 97% or 99% homology thereto.~~

- ~~6. The modified lectin protein as claimed in claim 5, wherein the position of the amino acid modification is selected from one or more of:~~
- ~~i) 27 and/or 28;~~
 - ~~ii) 47 and/or 48;~~
 - ~~iii) 70, 71 and/or 72; and/or~~
 - ~~iv) 105.~~
- ~~7. The modified lectin protein as claimed in claim 4, wherein the secondary carbohydrate binding site comprises a position selected from one or more of: 77, 78, 80, 101, 112 and 114 in SEQ ID NO. 1 or a corresponding position in a sequence having at least 60%, 70%, 80%, 90%, 95%, 97% or 99% homology thereto.~~
- ~~8. The modified lectin protein as claimed in claim 7, wherein the position of the amino acid modification is selected from one or more of:~~
- ~~i) 77, 78 and/or 80;~~
 - ~~ii) 101;~~
 - ~~iii) 112 and/or 114.~~
- ~~9. The modified lectin protein as claimed in any one of claims 1 to 8, wherein the amino acid modification is an amino acid substitution such that a substituting amino acid replaces an original amino acid.~~
- ~~10. The modified lectin protein as claimed in claim 6, wherein the amino acid substitution in the primary carbohydrate binding site is selected from one or more of:~~
- ~~i) at position 27: a conservative, favourable or unfavourable amino acid, wherein the conservative amino acid is non-polar or acidic; favourable is polar or basic and unfavourable amino acid is non-polar;~~
 - ~~ii) at position 28: a conservative, favourable, neutral or unfavourable amino acid, wherein the conservative amino acid is non-polar; favourable is polar, neutral is acidic or basic and unfavourable amino acid is polar;~~
 - ~~iii) at position 47: an unfavourable amino acid, which is basic or non-polar;~~
 - ~~iv) at position 48: an unfavourable amino acid, which is non-polar;~~
 - ~~v) at position 70: an unfavourable amino acid, which is non-polar;~~
 - ~~vi) at position 71: an unfavourable amino acid, which is non-polar;~~
 - ~~vii) at position 72: an unfavourable amino acid, which is non-polar; and/or~~

- ~~viii) at position 105: a conservative, favourable, neutral or unfavourable amino acid, wherein the conservative amino acid is basic or non-polar; favourable is polar, neutral is acidic, basic or polar and/or unfavourable amino acid is polar, non-polar or acidic.~~
- ~~11. The modified lectin protein as claimed in claim 8, wherein the amino acid substitution in the secondary carbohydrate binding site is selected from one or more of:~~
- ~~i) at position 77: an unfavourable amino acid which is non-polar;~~
 - ~~ii) at position 78: an unfavourable amino acid which is non-polar;~~
 - ~~iii) at position 80: an unfavourable amino acid which is non-polar;~~
 - ~~iv) at position 101: a favourable, an unfavourable or a neutral amino acid, wherein the favourable amino acid is polar or basic, the unfavourable amino acid is non-polar and the neutral amino acid is non-polar or acidic;~~
 - ~~v) at position 112: an unfavourable amino acid which is non-polar;~~
 - ~~vi) at position 114: an unfavourable amino acid which is polar.~~
- ~~12. The modified lectin protein as claimed in claim 1, wherein the modified lectin protein comprises at least one amino acid modification in the N terminus of i) or ii), wherein the N terminus comprises a position selected from: 1 and/or 2 in SEQ ID NO. 1 or a corresponding position in the sequence having at least 60%, 70%, 80%, 90%, 95%, 97% or 99% homology thereto.~~
- ~~13. The modified lectin protein as claimed in claim 12, wherein the amino acid modification is an amino acid substitution at position 1 and wherein a substituting amino acid is not threonine or valine.~~
- ~~14. The modified lectin protein as claimed in claim 13 wherein the substituting amino acid is selected from: alanine, glycine, proline or serine.~~
- ~~15. The modified lectin protein as claimed in claim 12, wherein the amino acid modification is an amino acid substitution at position 2 and wherein a substituting amino acid is tryptophan.~~
- ~~16. The modified lectin protein as claimed in claim 12 wherein cleavage of an initiator methionine is increased or decreased as compared with a control.~~

- ~~17.—The modified lectin protein as claimed in claim 1, wherein the amino acid modification at position 76 is an amino acid substitution with a non-polar amino acid.~~
- ~~18.—The modified lectin protein as claimed in claim 17, wherein the non-polar amino acid is selected from: glycine, valine or leucine.~~
- ~~19.—The modified lectin protein as claimed in claim 1, wherein the amino acid modification at position 44 or 89 is an amino acid substitution with a non-polar amino acid.~~
- ~~20.—The modified lectin protein as claimed in claim 19, wherein the non-polar amino acid is selected from: leucine, isoleucine or valine.~~
- 21.2. The modified lectin protein as claimed in ~~any of claims 1 to 20~~, wherein the modified lectin protein is soluble, partially soluble or insoluble and/or has cytotoxicity.
- 22.3. The modified lectin protein as claimed in claim 21 or 2, wherein the modified lectin protein has a cytotoxicity that is at least 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, or 90% of a control.
- 23.4. The modified lectin protein as claimed in claim 21 or 2, wherein the modified lectin protein has a percentage cytotoxicity that is less than 10% of a control, or is absent of cytotoxicity.
- 24.5. The modified lectin protein as claimed in claim 21 or 2, wherein the modified lectin protein has a percentage cytotoxicity that is at least a 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, or 100% increase compared with that of a control.
- 25.6. The modified lectin protein as claimed in any one claims 1 to 24-5, wherein the modified lectin protein is equal to or less than 500, 400, 300, 250, 200, or 150 amino acids in length.
- 26.7. A pharmaceutical composition comprising a modified lectin protein as claimed in claims 1 to 625 and a pharmaceutically acceptable diluent or excipient and optionally a further therapeutic ingredient.
- ~~27.—A method of treatment of cancer in a patient comprising administering the modified lectin protein as claimed in claim 1 or the pharmaceutical composition according to claim 26 to a patient.~~

~~28.8.~~ A modified lectin protein as claimed in any one of claims 1 to ~~256~~ or a pharmaceutical composition according to ~~26~~ for use in ~~the treatment of cancer medicine~~.

~~29.~~ ~~The pharmaceutical composition as claimed in claim 28 for use in the treatment of cancer.~~

~~30.9.~~ The modified lectin protein as claimed in claim 1 to ~~266~~ ~~as and when used in the for~~ use in the detection of a cancer cell, cancer diagnosis and/or cancer therapy.

~~31.10.~~ A nucleic acid molecule comprising a nucleotide sequence encoding a modified lectin protein as claimed in any one of the claims 1 to ~~26~~.

~~32.11.~~ A recombinant vector comprising an insert of a nucleic acid molecule as claimed in claim ~~31.10~~.

~~33.12.~~ The recombinant vector as claimed in claim ~~32.11~~ comprising operatively linked in a 5' to 3' direction: a promoter which functions in a host cell; a nucleotide sequence according to claim ~~31.10~~ encoding a modified lectin protein; and a termination signal.

~~34.13.~~ The recombinant vector as claimed in claim ~~32.11~~ or ~~33.12~~, wherein the recombinant vector is capable of being replicated, transcribed, translated and/or expressed in a unicellular organism.

~~35.14.~~ A transformed host cell comprising the nucleic acid molecule according to claim ~~31.10~~ or the recombinant vector as claimed in any one of claims ~~32.11~~ to ~~34.13~~.

~~36.15.~~ The transformed host cell as claimed in claim ~~35.14~~, wherein the host cell is an *Escherichia coli* bacterium or a yeast cell.

~~37.16.~~ A method for producing a recombinant *Sclerotium rolfsii* lectin protein comprising:

- i) culturing a host cell containing the recombinant vector as claimed in any one of claims ~~32.11~~ to ~~34.13~~ coding for a recombinant lectin protein;
- ii) expressing the recombinant lectin protein;
- iii) isolating a crude recombinant lectin protein from the culture.

17. The pharmaceutical composition as claimed in claim 7, for use in the treatment of cancer.

18. The pharmaceutical compositions as claimed in claim 7, for use in the detection of a cancer cell, cancer diagnosis and/or cancer therapy.