

CLAIMS

1. A cell culture matrix comprising a fungal derived protein.
2. The cell culture matrix of claim 1 wherein the fungal derived protein comprises a cell-adhesive sequence, optionally, the fungal derived protein retains its primary sequence.
3. The cell culture matrix of any one of claim 1 or claim 2, wherein the fungal derived protein is free of native functions.
4. The cell culture matrix of any one of the preceding claims, wherein the fungal derived protein forms particles having an average diameter of about 500 nm to about 1600 nm.
5. The cell culture matrix of any one of the preceding claims, wherein the fungal derived protein forms particles having a zeta potential of about -10 mV to about -50 mV.
6. The cell culture matrix of any one of the preceding claims, wherein the fungal derived protein extract forms a gel and/or a coating, optionally the fungal derived protein extract forms a hydrogel.
7. The cell culture matrix of any one of the preceding claims, wherein the fungi are non-pathogenic fungi.
8. The cell culture matrix of any one of the preceding claims, wherein the fungi are from the order of Agaricales, optionally from the division Basidiomycota.
9. The cell culture matrix of any one of the preceding claims, wherein the fungi are species selected from the group consisting of *Flammulina velutipes*, *Lentinus edodes*, and *Hypsizigus marmoreus*.
10. The cell culture matrix of any of the preceding claims, wherein the cell culture matrix further comprises a biomaterial component, optionally the cell culture matrix

further comprises one or more selected from the group consisting of alginate, chitosan, chitin, and cellulose fibres.

11. The cell culture matrix of any of the preceding claims, where in the cell culture matrix further comprises crosslinkers, optionally the crosslinker is calcium.

12. The cell culture matrix of any of the preceding claims, wherein the cell culture matrix forms a coating comprising alginate that is calcium crosslinked.

13. A composition comprising the cell culture matrix of any one of the preceding claims.

14. A cell culture system comprising a cell culture matrix comprising a fungal derived protein.

15. The cell culture system of claim 14, comprising the cell culture matrix of any one of claims 1 to 12 and/or the composition of claim 13.

16. Method of forming a cell culture matrix from a fungus, comprising extracting a fungal derived protein from the fungi.

17. The method of claim 16, wherein the extraction comprises aggregation of the fungal derived protein to form self-aggregating precipitate.

18. The method of claim 16 or 17, wherein the extraction step comprises aggregation by boiling the fungal derived protein and/or incubating the fungal derived protein in a condition that allows self-aggregating precipitate.

19. The method of any one of claims 16 to 18, wherein the extraction step comprises a fungal derived protein denaturation step that causes aggregation to occur, optionally wherein the denaturation step retains the primary sequence structure of the fungal derived protein, optionally the denaturation step retains the cell-adhesive sequence of the fungal derived protein.

20. The method of any one of claims 16 to 19, wherein the extraction step comprises aggregation step comprising heat treating the fungal derived protein for about 1 min to about 30 mins, optionally the aggregation step comprises heating the fungal derived protein from about 50°C to about 350°C.