

CLAIMS

1. A method of culturing cells, comprising:
 - (a) providing a microfluidic device comprising a microchannel comprising a surface, the microchannel in fluidic communication with a fluid source comprising fluid;
 - 5 (b) covalently attaching one or more proteins or peptides to the microchannel surface so as to create a treated surface;
 - (c) seeding viable cells on the treated surface so as to create attached cells;
 - (d) flowing fluid from the fluid source through the microchannel so as to create flowing conditions; and
 - 10 (e) culturing the attached cells under the flow conditions such that the cells remain attached and viable for at least 6 days.
2. A method according to Claim 1, in which the cells are hepatocytes.
3. A method according to Claim 2, further comprising (f) assessing viability by measuring the level of activity of one or more cellular enzymes.
- 15 4. A method according to Claim 3, in which the cellular enzyme is a CYP enzyme.
5. A method according to Claim 3, in which the cellular enzyme is a transaminase.
6. A method according to Claim 1, further comprising (f) assessing viability by measuring the level of expression of one or more cellular proteins.
7. A method according to Claim 1, in which the one or more proteins comprises collagen.
- 20 8. A method according to Claim 1, in which the one or more proteins comprises a mixture of collagen type I, fibronectin and collagen type IV.
9. A method according to Claim 1, in which the one or more peptides comprises RGD or a peptide comprising the RGD motif.
10. A method according to Claim 9, in which RGD is covalently attached to the

25 microchannel surface using N-sulphosuccinimidyl-6-(4'-azido-2'-nitrophenylamino) hexanoate.

11. A method according to Claim 1, in which the attached cells are cultured under flow conditions for 2 days.
12. A method according to Claim 1, in which the attached cells are cultured under flow conditions for 5 days.
- 5 13. A method according to Claim 1, in which the attached cells are cultured under flow conditions for 10 days.
14. A method according to Claim 13, in which the cells remain attached and viable for at least 14 days.
15. A method of treating a microfluidic device, comprising:
 - 10 (a) providing a microfluidic device comprising a microchannel comprising a surface, the microchannel in fluidic communication with a fluid source comprising fluid;
 - (b) covalently attaching one or more proteins or peptides to the microchannel surface so as to create a treated surface; and
 - (c) storing the microfluidic device in the absence of cells.
- 15 16. A method according to Claim 15, in which the storing is done at a controlled temperature below room temperature.
17. A method according to Claim 16, in which the storing is done at between 2 and 10°C.
18. A method according to Claim 15, in which the one or more covalently attached proteins is collagen I.
- 20 19. A method according to Claim 18, in which the covalently attached collagen I is stored dry.
20. A method according to Claim 15, in which the one or more covalently attached proteins is laminin.
21. A method according to Claim 20, in which the covalently attached laminin is stored wet.
- 25 22. A method according to Claim 15, in which the method further comprises:
 - (d) seeding viable cells on the treated surface so as to create attached cells;

(e) flowing fluid from the fluid source through the microchannel so as to create flowing conditions; and

(f) culturing the attached cells under the flow conditions such that the cells remain attached and viable for at least 6 days.

5 23. A method according to Claim 22, in which the cells are hepatocytes.

24. A method according to Claim 22, in which the attached cells are cultured under flow conditions for 2 days.

25. A method according to Claim 22, in which the attached cells are cultured under flow conditions for 5 days.

10 26. A method according to Claim 22, in which the attached cells are cultured under flow conditions for 10 days.

27. A method according to Claim 26, in which the cells remain attached and viable for at least 14 days.