

**CLAIMS**

1. A method of culturing cells, comprising:
  - (a) providing a microfluidic device comprising a microchannel comprising a surface, the surface covalently attached to a light reactive portion of a N-sulphosuccinimidyl-6-(4'-azido-2'-nitrophenylamino) hexanoate (sulfo-SANPAH) crosslinker, the microchannel in fluidic communication with a fluid source comprising fluid;
  - (b) covalently attaching one or more proteins or peptides to a chemically reactive portion of the sulfo-SANPAH crosslinker so as to create a treated surface;
  - (c) seeding viable cells on the treated surface so as to create attached cells;
  - 10 (d) flowing fluid from the fluid source through the microchannel so as to create flowing conditions; and
  - (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.
- 15 3. A method according to Claim 2, further comprising (f) assessing viability by measuring the level of activity of one or more cellular enzymes.
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
 

20 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.
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
 

25 peptide comprising the RGD motif.
10. A method according to Claim 1, in which the attached cells are cultured under flow conditions for 2 days.

11. A method according to Claim 1, in which the attached cells are cultured under flow conditions for 5 days.
12. A method according to Claim 1, in which the attached cells are cultured under flow conditions for 10 days.
- 5 13. A method according to Claim 12, in which the cells remain attached and viable for at least 14 days.
14. A method of treating a microfluidic device, comprising:
  - (a) providing a microfluidic device comprising a microchannel comprising a surface, the surface covalently attached to a light reactive portion of a N-sulphosuccinimidyl-6-  
10 (4'-azido-2'-nitrophenylamino) hexanoate (sulfo-SANPAH) crosslinker, the microchannel in fluidic communication with a fluid source comprising fluid;
  - (b) covalently attaching one or more proteins or peptides to a chemically reactive portion of the sulfo-SANPAH crosslinker so as to create a treated surface; and
  - (c) storing the microfluidic device wet and in the absence of cells.
- 15 15. A method according to Claim 14, in which the storing is done at a controlled temperature below room temperature.
16. A method according to Claim 15, in which the storing is done at between 2 and 10°C.
17. A method according to Claim 14, in which the one or more covalently attached proteins is collagen I.
- 20 18. A method according to Claim 14, in which the one or more covalently attached proteins is laminin.
19. A method according to Claim 14, 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  
25 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.

20. A method according to Claim 19, in which the cells are hepatocytes.
21. A method according to Claim 19, in which the attached cells are cultured under flow conditions for 2 days.
22. A method according to Claim 19, in which the attached cells are cultured under flow  
5 conditions for 5 days.
23. A method according to Claim 19, in which the attached cells are cultured under flow conditions for 10 days.
24. A method according to Claim 23, in which the cells remain attached and viable for at least 14 days.