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 bifunctional 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 bifunctional crosslinker 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

(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.

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.

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 the bifunctional crosslinker is 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.

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:

(a) providing a microfluidic device comprising a microchannel comprising a surface, the surface covalently attached to a light reactive portion of a bifunctional 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 bifunctional crosslinker so as to create a treated surface; and

(c) storing the microfluidic device wet and in the absence of cells.

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.

19. A method according to Claim 15, in which the one or more covalently attached proteins is laminin.

20. 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.

21. A method according to Claim 20, in which the cells are hepatocytes.

22. A method according to Claim 20, in which the attached cells are cultured under flow conditions for 2 days.

23. A method according to Claim 20, in which the attached cells are cultured under flow conditions for 5 days.

24. A method according to Claim 20, in which the attached cells are cultured under flow conditions for 10 days.

25. A method according to Claim 24, in which the cells remain attached and viable for at least 14 days.