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 extracellular matrix proteins or peptides to a chemically reactive portion of the sulfo-SANPAH crosslinker so as to create a treated surface;

(c) seeding viable epithelial cells on the treated surface so as to create attached epithelial cells;

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

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

2. A method according to Claim 1, in which the epithelial 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 extracellular matrix proteins comprises collagen.

8. A method according to Claim 1, in which the one or more extracellular matrix 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 extracellular matrix peptides comprises RGD or a peptide comprising the RGD motif.

10. A method according to Claim 1, in which the attached epithelial cells are cultured under flow conditions for 10 days.

11. A method according to Claim 10, in which the epithelial cells remain attached and viable for at least 14 days.

12. 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-(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 extracellular matrix proteins or peptides to a chemically reactive portion of the sulfo-SANPAH crosslinker so as to create a treated surface;

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

(d) seeding viable epithelial cells on the treated surface so as to create attached epithelial cells;

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

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

13. A method according to Claim 12, in which the storing is done at a controlled temperature below room temperature.

14. A method according to Claim 13, in which the storing is done at between 2 and 10°C.

15. A method according to Claim 12, in which the one or more covalently attached extracellular matrix proteins is collagen I.

16. A method according to Claim 12, in which the one or more covalently attached extracellular matrix proteins is laminin.

2017. A method according to Claim 12, in which the epithelial cells are hepatocytes.

18. A method according to Claim 12, in which the attached epithelial cells are cultured under flow conditions for 10 days.

19. A method according to Claim 18, in which the epithelial cells remain attached and viable for at least 14 days.