

CLAIMS

1. A spheroid tissue microarray comprising a regular array of tissue spheroids arranged in a grid pattern and embedded within a porous mould, in which the spheroids are horizontally accurately positioned such that the centrepoint of each spheroid is no more than 100 micrometres from its regular grid location.
2. A spheroid tissue microarray according to Claim 1, in which the porous mould is formed from an agarose or agar gel.
3. A spheroid tissue microarray according to Claim 1 or 2, containing from 100 to 300 spheroids.
4. A spheroid tissue microarray according to Claim 3, comprising a 10 x 17 grid of 170 spheroids.
5. A spheroid tissue microarray according to Claim 1 or 2, containing 96 spheroids.
6. A spheroid tissue microarray according to any preceding claim, in which the density of spheroids per cm² is 100 or more.
7. A spheroid tissue microarray according to any preceding claim, in which the tissue spheroids comprise tissue derived from one or more of induced pluripotent stem cells, primary cells, cell lines derived from cancerous tissues, neuronal cells, skin cells, liver cells, tumour cells, stromal cells, immune cells and endothelial cells.
8. A spheroid tissue microarray according to any preceding claim, in which the tissue spheroids are formed from the *in vitro* 3D culture of cells.
9. A spheroid tissue microarray according to any preceding claim, in which the tissue spheroids have a diameter of 50 to 500µm.
10. A spheroid tissue microarray according to any preceding claim, in which the tissue spheroids comprise a substrate on which cells are grown prior to embedding.
11. A spheroid tissue microarray according to Claim 10, in which the substrate is a bead formed from polystyrene (amberlite) or another porous plastic material.

12. A spheroid tissue microarray according to Claim 10 or 11, in which the tissue spheroids comprise human skin cells.
13. A spheroid tissue microarray according to any preceding claim, in which the tissue spheroids are stained for histological analysis.
- 5 14. A spheroid tissue microarray according to any preceding claim, which is impregnated with an additional structural agent.
15. A spheroid tissue microarray according to Claim 14, which is impregnated with paraffin wax or a resin.
16. A method of manufacturing a spheroid tissue microarray according to any preceding
10 claim, which method comprises the steps of:
 - forming a mould of porous material from liquid mould material in a casting mould, and allowing the liquid mould material to set;
 - removing the porous mould from the casting mould;
 - topping up the porous mould with further liquid mould material, and allowing recesses
15 to form in the surface of the mould by the drawing-in of liquid mould material through shrinkage as the liquid mould material sets;
 - placing tissue spheroids into the recesses in the surface of the porous mould; and
 - sealing the tissue spheroids within the mould by topping off with liquid mould material and allowing the liquid mould material to set.
- 20 17. A method according to Claim 16, in which the liquid mould material is 0.5 to 4% agarose in water.
18. A method according to Claim 16 or 17, in which the step of forming the mould of porous material from liquid mould material in a casting mould is performed at a temperature of from 60 to 70°C.
- 25 19. A method according to Claim 16, 17 or 18, in which the liquid mould material is allowed to set in the casting mould at room temperature for 20 to 45 minutes, followed by chilling at 0 to 5°C for 20 to 45 minutes.

20. A method according to any of Claims 16 to 19, in which prior to topping up, the porous mould is heated at 60 to 70°C for 10 to 30 minutes in a sealed environment.
21. A method according to any of Claims 16 to 20, in which the porous mould is topped up with liquid mould material comprising an agarose gel at 0.1 to 1.0% in water.
- 5 22. A method according to any of Claims 16 to 21, in which the recesses are formed within the top 1mm of the mould.
23. A method according to any of Claims 16 to 22, in which the tissue spheroids are sealed within the mould recesses by topping off with liquid mould material at a temperature of from 60 to 70°C.
- 10 24. A method according to any of Claims 16 to 23, in which following sealing of the tissue spheroids within the mould recesses, the liquid mould material is allowed to set by cooling to 0 to 5°C for approximately 30 minutes.
25. A method according to any of Claims 16 to 24, in which the spheroid tissue microarray is impregnated with an additional structural agent.
- 15 26. A method according to Claim 25, in which the structural agent is paraffin wax or a resin.
27. A method of manufacturing a spheroid tissue microarray according to any of Claims 1 to 15, which method comprises the steps of: forming a mould of porous material from liquid mould material in a casting mould; allowing the liquid mould material to set; removing the porous mould from the casting mould; placing spheroids in recesses at the bases of wells in
20 the mould of porous material; and sealing the spheroids within the porous mould by adding further porous material on top of the spheroids; in which the recesses at the bases of the wells in the porous material are formed by protrusions of the casting mould carrying further, nipple-shaped, protrusions.
28. A method according to Claim 27, further comprising a subsequent step of impregnating
25 the microarray with an additional structural agent.
29. A method according to Claim 28, in which the structural agent is paraffin wax or a resin.

30. Use of a spheroid tissue microarray according to any of Claims 1 to 15 in an analytical method, comprising sectioning the spheroid tissue microarray so as to simultaneously section multiple spheroids and analysing the sections.