CLAIMS

1. An apparatus for bio artificial muscle production from cultured cells, the apparatus comprising an elongate body and at least one trough; the elongate body having at least one circumferential groove and being operable to extend, by close-fitting relationship, centrally through the at least one trough, the at least one trough extending in a closed path, at least one of the circumferential grooves opening into an inner edge of a trough of the at least one trough.

2. An apparatus according to claim 1, wherein the closed path is a circle, thereby providing at least one circular trough surrounding the elongate body.

3. An apparatus according to any one of the preceding claims, wherein the elongate body extends, by close-fitting relationship, centrally through the at least one trough, at least one of the circumferential grooves opening into an inner edge of a trough of the at least one trough.

4. An apparatus according to any one of the preceding claims, wherein at least one trough of the at least one trough has a sloping wall extending from a low region of the trough to the inner edge, and an outer wall extending from the low region to an outer edge of the trough.

5. An apparatus according to any one of the preceding claims comprising a plurality of elongate bodies, with separate elongate bodies of the plurality of elongate bodies extending respectively through separate troughs of the at least one trough.

6. An apparatus according to claim 5, wherein troughs are joined edgewise outside their outer walls to laterally-adjacent troughs whereby separate elongate bodies extend through the trough and the laterally-adjacent trough.

7. An apparatus according to claim 6, wherein troughs joined edgewise are formed as a unitary component, the unitary component having a top surface and a bottom surface.

8. An apparatus according to claim 7, wherein the unitary component has at least one through-hole communicating between the top surface and the bottom surface, the through-hole located outside the outer walls of the troughs.

9. An apparatus according to any one of the preceding claims, wherein separate troughs of the at least one trough are stacked.

10. An apparatus according to claim 9, wherein the at least one trough is provided with vertically extending spacers to provide distance between adjacently stacked troughs.

11. An apparatus according to any one of the claims 7 or 8 having at least one unitary component of troughs joined edgeways, said unitary components being joined vertically to provide a grand unitary component, by joining the respective top surfaces of troughs of a unitary component with corresponding bottom surfaces of troughs of an above-adjacent unitary component.

12. An apparatus according to any one of the preceding claims, wherein the elongate body has a longitudinal groove of at least the depth of the at least one circumferential groove.

13. An apparatus according to any one of the preceding claims, wherein each of the circumferential grooves opens into the inner edge of a trough of the at least one trough.

14. An apparatus according to any one of the preceding claims, wherein the close-fitting relationship between the elongate body and the at least one trough comprises a sliding engagement.

15. An apparatus according to any one of the preceding claims, wherein the elongate body is made of a flexible material.

16. An apparatus according to any one of the preceding claims, wherein the elongate body is in the form of a pillar.

17. A process for the production of tissue from cells, via a transitioning intermediate which transitions from the cells into the tissue, the process comprising:

a. providing an apparatus according to any one of the preceding claims;

b. adding the cells and a liquid hydrogel, comprising a scaffolding biomaterial, into at least one trough of the apparatus;

c. cross-linking the scaffolding biomaterial;

d. applying a differentiation medium to the transitioning intermediate; and

e. incubating the transitioning intermediate in the differentiation medium to form tissue comprised in a ring in the at least one circumferential groove.

18. A process according to claim 17, wherein the tissue in step e is in the form of myofibres.

19. A process according to any one of the claims 17 or 18, wherein the cells are selected from at least one of a group consisting of mesenchymal cells, myoblasts and myocytes.

20. A process according to any one of the claims 17 to 19, wherein the transitioning intermediate migrates from the at least one trough to the at least one circumferential groove after step c of claim 17.

21. A process according to any one of the claims 17 to 20, wherein the cells are added to the hydrogel before adding into the at least one trough.

22. A process according to any one of the claims 17 to 21, wherein the differentiation medium is rejuvenated after at least one part of the period of incubation, wherein the rejuvenation comprises at least one of i) oxygenation, ii) addition of at least one nutrient, iii) removal of particulate matter, and iv) exchange of the differentiation medium with a fresh differentiation medium.

23. A process according to any one of the claims 17 to 22, further comprising:

f. collecting at least one elongate body by removal of the elongate body from its respective at least one trough, said elongate body having the ring of biomaterial in the at least one circumferential groove.

24. A process according to any one of the claims 17 to 23, further comprising:

g. cutting the ring of tissue to release it from the elongate body.

25. A process according to claim 24, wherein the cutting is performed along a longitudinal groove of the elongate body.

26. A process according to any one of claims 17 to 25, wherein the apparatus further comprises at least one pipe having a closed end and a side port near the closed end, the pipe operable to extend movably through the apparatus

a) outside the outer walls of the at least one trough and/or

b) centrally through the at least one trough;

such that the side port may be aligned in fluid communication with a trough;

the process comprising adding the cells and the liquid hydrogel comprising scaffolding biomaterial into the at least one trough of the apparatus via the pipe and the side port.