

CLAIMS

What is claimed is:

1. A device, comprising:
a porous membrane having first and second sides;
endothelial cells disposed on first side of said membrane; and
muscle cells disposed on second side of said membrane.
2. The device of claim 1, wherein said muscle cells comprise cardiac, smooth and/or skeletal muscle cells.
3. The device of claim 1, wherein said muscle cells are part of a muscular thin film.
4. The device of claim 1, wherein said second side comprises at least one electrode.
5. The device of claim 1, wherein said muscle cells are in electrical proximity with at least one electrode.
6. The device of claim 1, wherein said endothelial cells are disposed on a growth promoting layer, said growth promoting layer disposed at least partially on said membrane.
7. A device, comprising:
first and second channels;
endothelial cells disposed in said first channel; and
muscle cells disposed in said second channel.
8. The device of claim 7, wherein said device further comprises a membrane dividing said first and second channels.
9. The device of claim 8, wherein said endothelial cells are disposed on said membrane.

10. The device of claim 8, wherein said muscle cells are disposed on the bottom of said second channel.
11. The device of claim 8, wherein said muscle cells are disposed on a gel layer, said gel layer disposed on the bottom of said second channel.
12. A fluidic device comprising:
a porous membrane;
a first channel defining member disposed on the porous membrane, wherein the porous membrane and the first channel defining member define a first fluidic channel;
a support member providing mechanical support for the fluidic device;
a base disposed on the support member;
a second channel defining member disposed on the base, wherein porous membrane is disposed on the second channel defining member, and wherein the second channel defining member and the porous membrane define a second fluidic channel; and
a flexible substrate comprising a polymer layer and/or a hydrogel layer disposed at least partially on the surface of the base, the flexible substrate configured to support growth of a functional muscle tissue.
13. The fluidic device of claim 12, further comprising one or more securing elements that releasably secure the first channel defining member, the porous membrane, the second channel defining member and the base to the support member.
14. The fluidic device of claim 13, wherein the fluidic device further comprises a gasket disposed between the base and the second channel defining member.
15. The fluidic device of claim 12, further comprising a growth promoting layer disposed on the porous membrane within the first fluidic channel, the growth promoting layer configured to promote adhesion and growth of cells.

16. The fluidic device of claim 12, wherein the base comprises a cyclic olefin copolymer (COC).
17. The fluidic device of claim 12, further comprising a flexible electrode array at least partially disposed between the flexible substrate and the base.
18. The fluidic device of claim 12, further comprising a functional muscle tissue disposed on the flexible substrate.
19. The fluidic device of claim 18, wherein the functional muscle tissue and the flexible substrate form a functional muscle tissue strip having one or two cantilevered portions.
20. A method, comprising:
providing a fluidic device comprising first and second portions;
seeding endothelial cells into said first portion; and
seeding muscle cells into said second portion.
21. The method of claim 20, wherein said muscle cells are seeded on a flexible substrate in second portion.
22. The method of claim 21, wherein the method further comprises culturing the seeded muscle cells to form a functional muscle tissue.
23. The method of claim 20, wherein said endothelial cells are seeded onto a growth promoting layer in said first portion.
24. The method of claim 20, wherein the method further comprises culturing the endothelial cells on the growth promoting layer.