

CLAIMS

What is claimed is:

1. A device, comprising:
 - a) a body having a first microchannel and a second microchannel;
 - b) a membrane located between the first microchannel and the second microchannel;
 - c) at least one transendothelial electrical resistance electrode aligned along the first or second microchannel, the at least one transendothelial electrical resistance electrode having a platinum black coating; and
 - d) a platform under the second microchannel, the platform having a multi-electrode array.
2. The device of claim 1, further comprising a plurality of cells between the at least one transendothelial electrical resistance electrode and the membrane.
3. The device of claim 1, further comprising a plurality of cells between the multi-electrode array and the membrane.
4. The device of claim 1, wherein the at least one transendothelial electrical resistance electrode is between the first microchannel and the membrane.
5. The device of claim 1, wherein the at least one transendothelial electrical resistance electrode is between the second microchannel and the platform.
6. The device of claim 2, wherein the at least one transendothelial electrical resistance electrode is on the plurality of cells.
7. The device of claim 1, wherein the first microchannel is a coated microchannel.
8. The device of claim 1, wherein the second microchannel is a coated microchannel.
9. The device of claim 7, wherein the coated microchannel comprises fibronectin.

10. The device of claim 3, wherein the plurality of cells is on the multi-electrode array.
11. A device, comprising:
 - a) a fluidic channel having at least two fluidic ports;
 - b) electrically-active cells adhered within the fluidic channel; and
 - b) an electrode having a platinum black coating, the electrically-active cells being on the electrode.
12. The device of claim 11, wherein the platinum black coating is stable.
13. The device of claim 11, wherein the electrode contacts at least a portion of the fluidic channel.
14. The device of claim 13, wherein the electrically-active cells are layered on a membrane.
15. The device of claim 14, wherein the membrane contacts the fluidic channel.
16. The device of claim 11, wherein the electrode includes a transendothelial electrical resistance electrode.
17. The device of claim 16, wherein the transendothelial electrical resistance electrode is attached to the fluidic channel.
18. The device of claim 16, wherein the transendothelial electrical resistance electrode is a gold-patterned polycarbonate electrode.
19. The device of claim 11, wherein the electrode includes a multi-electrode array.
20. The device of claim 19, wherein the multi-electrode array is attached to a glass platform.

21. The device of claim 20, wherein the fluidic channel is between the glass platform and the membrane.
22. A method, comprising:
 - a) providing a device having
 - i) a fluidic channel with at least two fluidic ports,
 - ii) an electrode having a platinum black coating, and
 - iii) a cell culture media within the fluidic channel; and
 - b) seeding electrically-active cells within the fluidic channel.
23. The method of claim 22, wherein the platinum black coating is stable.
24. The method of claim 22, further comprising flowing the cell culture media through the fluidic channel and across the electrically active cells.
25. The method of claim 22, further comprising recording at least one signal using the electrode.
26. The method of claim 25, wherein the at least one signal includes an extracellular electric cell activity.
27. The method of claim 25, wherein the at least one signal includes a capacitance value.
28. The method of claim 25, wherein the at least one signal includes an impedance value.
29. The method of claim 25, wherein the at least one signal includes a field potential duration.
30. The method of claim 22, wherein the electrically-active cells are cardiomyocyte cells.
31. The method of claim 22, wherein the electrically-active cells are neuronal cells.
32. The method of claim 22, wherein the electrically-active cells are muscle cells.

33. The method of claim 22, wherein the electrode includes a multi-electrode array.
34. The method of claim 22, wherein the electrode includes a transendothelial electrical resistance electrode.
35. The method of claim 34, wherein the transendothelial electrical resistance electrode is a gold-patterned polycarbonate electrode.
36. The method of claim 22, wherein the culture media further includes a drug or compound.
37. The method of claim 36, wherein the drug is isoproterenol.
38. The method of claim 36, wherein the compound is tissue necrosis factor- α .
39. The method of claim 22, wherein the electrically active cells are on the electrode.