CLAIMS

We claim:

1. A microfluidic immunoblotting system comprising:

(a) a multi-lane gel-electrophoresis gel;

(b) a transfer membrane; and

(c) a microfluidic device comprising a flat membrane-contacting surface and a plurality of non-connected parallel microfluidic channels, wherein the entire length of said microfluidic channels are open to the membrane-contacting surface, wherein said microfluidic channels are grouped in multi-channel sets, with each multi-channel set aligned with a lane of the gel-electrophoresis gel.

2. The microfluidic immunoblotting device of claim 1, wherein each of the multi-channel sets comprises 2-20 microfluidic channels.

3. The microfluidic immunoblotting device of claim 2, wherein the distance separating microfluidic channels with a channel set is less than the distance between channel sets.

4 The microfluidic immunoblotting device of claim 1, wherein each of the microfluidic channels comprises a reservoir at one end of the microfluidic channel.

5. The microfluidic immunoblotting device of claim 1, wherein each of the microfluidic channels is 100-200 μm wide.

6. The microfluidic immunoblotting device of claim 5, wherein each of the microfluidic channels is 140-160 μm wide.

7. The microfluidic immunoblotting device of claim 1, wherein each of the microfluidic channels is 50-150 μm deep.

8. The microfluidic immunoblotting device of claim 1, wherein each of the microfluidic channels is 90-110 μm deep.

9. The microfluidic immunoblotting device of claim 1, wherein said device comprises polydimethylsiloxane (PDMS).

10. The microfluidic immunoblotting device of claim 1, wherein said device consists essentially of polydimethylsiloxane (PDMS).

11. A method of immunoblotting using the microfluidic immunoblotting system of one or claims 1-10, comprising:

(a) loading a protein-containing sample onto one or more lanes of the multi-lane gel-electrophoresis gel;

(b) separating peptides, polypeptides, and/or proteins on the gel by electrophoresis;

(c) transferring the separated peptides, polypeptides, and/or proteins to the transfer membrane;

(d) placing the transfer membrane onto the membrane-contacting surface of the microfluidic device;

(e) applying multiple antibody solutions to the peptides, polypeptides, and/or proteins of each lane on the transfer membrane via the microfluidic channels of the microfluidic device.

12. The system of claim 11, wherein each microfluidic channel of a channel set comprises a different antibody-containing solution.

13. The system of claim 12, wherein each channel set comprises the same combination of antibody-containing solutions.

14. The system of claim 11, wherein each microfluidic channel comprises a different antibody-containing solution.