CLAIMS

1. A microfluidic device, comprising:

a gel chamber with a gel matrix disposed therein, the gel chamber including an open top surface region;

a fluidic chamber wherein a first interface region is formed between the gel chamber and the fluidic chamber;

a membrane disposed at the first interface region, the membrane including a first side facing the gel chamber and a second side facing the fluidic chamber; and

a movable cover disposed on the gel chamber above the gel matrix, the movable cover configured to provide access to the gel chamber, wherein the movable cover defines an aperture having one end configured to align with the opened top surface region of the gel chamber when the movable cover is disposed on the gel chamber such that a fluid material entering the aperture flows through the movable cover and into the opened top surface region of the gel chamber.

2. The microfluidic device of claim 1, wherein the gel matrix includes fibroblasts and keratinocytes in or on the gel matrix.

3. The microfluidic device of Claim 1, wherein a gel matrix disposed in the gel chamber is secured by structural anchors.

4. The microfluidic device of one of claims 1 or 2, wherein the aperture is a channel.

5. The microfluidic device of claim 4, wherein the channel is circular, oval, spiral, or irregularly shaped.