CLAIMS

What is claimed is:

1. A method of producing a tissue-mimetic construct having a basement membrane, comprising:
   a) combining epithelial cells and stromal cells with one or more carbohydrate-based macromolecules having a hydrodynamic radius in the range of from about 2nm to about 50nm, thereby producing a mixed cell culture; and
   b) maintaining the cell culture under conditions in which the epithelial cells and stromal cells proliferate and produce a basement membrane,

thereby producing a tissue-mimetic construct having a basement membrane.

2. The method of Claim 1, wherein the tissue-mimetic construct is a skin-mimetic construct, a corneal tissue-mimetic construct, an oral mucosa-mimetic construct, a bladder tissue-mimetic construct, a liver tissue-mimetic construct, a pancreatic tissue-mimetic construct, a kidney tissue-mimetic construct, or a lung tissue-mimetic construct.

3. The method of Claim 1 or 2, wherein the tissue-mimetic construct is a skin-mimetic construct, the epithelial cells are keratinocytes and the stromal cells are fibroblasts.

4. The method of any one of the preceding claims, wherein the mixed cell culture includes a scaffold.

5. The method of Claim 4, wherein the scaffold is a hydrogel.

6. The method of Claim 5, wherein the hydrogel comprises collagen, fibrin, agarose, hyaluronic acid, polyethylene glycol, alginate or cellulose.

7. The method of any one of Claims 1 to 6, wherein the combining step is done by seeding the epithelial cells and stromal cells together with the carbohydrate-based macromolecules.

8. A tissue-mimetic construct produced by the method of any one of the preceding claims, wherein the tissue-mimetic construct comprises anchoring fibrils.

9. A method of producing an acellular scaffold containing an extracellular matrix, comprising:

a) combining epithelial cells, stromal cells and one or more carbohydrate-based macromolecules, thereby producing a mixed cell culture;
b) maintaining the cell culture under conditions in which the epithelial cells and stromal cells proliferate and produce an extracellular matrix; and
c) decellularizing the cell culture,

thereby producing an acellular scaffold containing an extracellular matrix.

10. The method of Claim 9, wherein the epithelial cells are keratinocytes.

11. The method Claim 9 or 10, wherein the stromal cells are fibroblasts.

12. A method of producing a scaffold comprising a hydrogel that is enriched in extracellular matrix (ECM) components, the method comprising:

a) preparing an enriched extracellular matrix by culturing epithelial cells and stromal cells with one or more carbohydrate-based macromolecules having a hydrodynamic radius in the range of from about 2 nm to about 50 nm; and
b) combining the enriched extracellular matrix with a hydrogel, thereby producing a scaffold comprising the hydrogel that is enriched in ECM components.

13. The method of Claim 12, wherein the hydrogel is a collagen gel, a fibrin gel, an agarose gel, a hyaluronic gel, a polyethylene glycol gel, an alginate gel or a cellulose gel.

14. The method of Claim 12 or 13, wherein the hydrogel comprises agarose or an agarose conjugate.

15. The method of any one of Claims 12-14, wherein the epithelial cells are keratinocytes.

16. The method of any one of Claims 12-15, wherein the stromal cells are fibroblasts.

17. A tissue-mimetic construct according to Claim 8 for use in therapeutic applications.

18. A method of assessing whether an agent is suitable for administering to the a tissue, comprising:

a) contacting a tissue-mimetic construct according to Claim 8 with an agent to be assessed;

b) determining whether the agent produces a desired effect on the tissue-mimetic construct compared to a control,

wherein if the agent produces a desired effect on the tissue-mimetic construct compared to a control, then the agent is suitable for administering to the tissue.

19. A method of producing a scaffold that is enriched in extracellular matrix (ECM) components, wherein the ECM components are concentrated on the surface of the scaffold, the method comprising:

a) preparing an enriched extracellular matrix by culturing epithelial cells and stromal cells with one or more carbohydrate-based macromolecules having a hydrodynamic radius in the range of from about 2nm to about 50nm; and

b) attaching the enriched extracellular matrix to the surface of the scaffold,

thereby producing a scaffold that is enriched in ECM components on the surface.

20. The method according to Claim 19, wherein the scaffold is a thermo-responsive polymer.