CLAIMS

1. A three-dimensional discontinuous entity for culturing of cells comprising
   a. an aqueous medium; and
   b. hydrogel bodies comprising cellulose nanofibrils and/or derivatives thereof suspended in the aqueous medium,

   wherein the ratio of total volume of the hydrogel bodies to total volume of the three-dimensional discontinuous entity is 10%-99% (v/v), preferably 50%-95% (v/v).

~~2. The three-dimensional discontinuous entity according to claim 1 wherein the ratio of total volume of the hydrogel bodies to total volume of the three-dimensional discontinuous entity is 10%-99% (v/v), preferably 50%-95% (v/v).~~

~~3~~2. The three-dimensional discontinuous entity according to claim 1 ~~or 2~~ wherein the hydrogel bodies are interconnected.

~~4~~3. The three-dimensional discontinuous entity according to ~~any one of claims 1-3~~claim 1 or 2 wherein the yield stress of the three-dimensional discontinuous entity is lower than the yield stress of the corresponding continuous hydrogel in the same conditions.

~~5~~4. The three-dimensional discontinuous entity according to ~~any one of claims 1-4~~ claim 3 wherein the yield stress of the three-dimensional discontinuous entity is 1-95% of the yield stress of the corresponding continuous hydrogel in the same conditions.

~~6~~5. The three-dimensional discontinuous entity according to any one of claims 1-~~5~~4 wherein the cellulose nanofibrils are of plant origin.

~~7~~6. The three-dimensional discontinuous entity according to any one of claims 1-~~6~~5 wherein the diameter of the cellulose nanofibrils is less than 1 µm, preferably less than 200 nm, more preferably less than 100 nm.

~~8~~7. The three-dimensional discontinuous entity according to any one of claims 1-~~7~~6 wherein the cellulose nanofibrils comprise native ion-exchanged, chemically modified or physically modified derivatives of cellulose nanofibrils or nanofibril bundles.

~~9~~8. The three-dimensional discontinuous entity according to any one of claims 1-~~8~~7 wherein the aqueous medium is a cell culture medium comprising at least one nutrient source and at least one component required for sustaining undifferentiated, differentiating or differentiated cell growth.

~~10~~9. A method for manufacturing a three-dimensional discontinuous entity for culturing cells comprising:

a. providing cellulose nanofibrils and/or derivatives thereof in a form of
   i. a homogeneous hydrogel;
   ii. a combination of the homogeneous hydrogel with an aqueous medium; and/or
   iii. dehydrated gel bodies or dry granulated cellulose nanofibrils or derivatives thereof hydrated in an aqueous medium; and

b. mixing in conditions favouring mechanical disruption of the homogeneous structure of the hydrogel to obtain a suspension of hydrogel bodies as a three-dimensional discontinuous entity,

wherein in the three-dimensional discontinuous entity the ratio of total volume of the hydrogel bodies to total volume of the three-dimensional discontinuous entity is 10%-99% (v/v), preferably 50%-95% (v/v).

~~11~~10. The method according to claim ~~10~~9 wherein step a. comprises cellulose nanofibrils provided in a form of the combination of the homogeneous hydrogel with an aqueous medium and, optionally, excess of the aqueous medium is removed.

~~12~~11. ~~A method for manufacturing a cell culture matrix wherein in the method according to claim 10 or 11~~The method according to claim 9 or 10 wherein cells are added and the aqueous medium is a cell culture medium.

~~13~~12. A three-dimensional discontinuous entity or a cell culture matrix manufactured using the method according to any one of claims ~~10-12~~9-11.

~~14~~13. A cell culture matrix comprising cells and/or tissue and a three-dimensional discontinuous entity according to any one of the claims ~~1 – 9 or 13~~1 – 8 or 12 wherein the cells and/or tissue are present at least partially embedded in said entity in a three-dimensional or two-dimensional arrangement.

~~15~~14. A cell culture matrix according to claim ~~14~~13 wherein the cells are differentiated or undifferentiated mammalian cells.

~~16~~15. A cell culture matrix according to claim ~~14~~13 wherein the cells are undifferentiated stem cells.

~~17~~16. The cell culture matrix according to ~~any one of claims 14-16~~ claim 13 or 15 wherein the cells are embryonic stem cells or induced pluripotent stem cells.

~~18~~17. The cell culture matrix according to any one of claims ~~14-17~~13-16 wherein the cells are human cells or non-human cells.

~~19~~18. The cell culture matrix according to claim ~~18~~17 wherein the cells are non-human embryonic stem cells or induced pluripotent stem cells.

~~20~~19. An article for cell culture comprising

a. a substrate having a surface;

b. a three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12, or a three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12 in a dehydrated form;

c. and optionally at least one component selected from the group consisting of a cell culture medium, extra cellular matrix components, serum, growth factors, proteins, antibiotics, preservatives.

~~21~~20. Use of the three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12, or the article according to claim ~~20~~19 for culturing cells or tissues.

~~22~~21. A method of transporting cells, wherein the cells are transported in the three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12, or in the article according to claim ~~20~~19.

~~23~~22. A method for three-dimensional or two-dimensional culturing of cells or tissues comprising providing the three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12, or the article according to claim ~~20~~19, inoculating at least one cell with the three-dimensional discontinuous entity; and culturing to obtain a cell mass.

~~24~~23. The method according to claim ~~23~~22 wherein at least two cell types of different origin are cultured as a co-culture.

~~25~~24. The method according to any one of claims ~~23-24~~22-23 wherein the cells form complexes with the hydrogel bodies.

~~26~~25. The method according to any one of claims ~~23-25~~22-24 wherein at least one subculture is carried out by passaging the cultured cells at least once during culturing.

~~27~~26. The method according to claim ~~23-25~~22-24 wherein the passaging comprises cell mass separation from the three-dimensional discontinuous entity wherein the three-dimensional discontinuous entity is treated with an enzyme.

~~28~~27. The method according to claim ~~27~~26 wherein the three-dimensional discontinuous entity is enzymatically treated with a cellulase for a time sufficient to at least partly release cell mass.

~~29~~28. The method according to claim ~~28~~27 wherein the cellulase is inactivated or removed from the cell mass after enzymatic treatment.

~~30~~29. The method according to any one of claims ~~22-29~~21-28 wherein the cells comprise undifferentiated cells, such as stem cells, and the cells are maintained undifferentiated between passages.

~~31~~30. The method according to any one of claims ~~22-30~~21-29 wherein the cell mass or cells are harvested from the cell culture and mixed with the three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12 in a medium suitable for maintaining cell growth to provide a three-dimensional culture; and the culture is incubated in conditions and a time sufficient to promote cell propagation whereby spheroids are formed.

~~32~~31. The method according to any one of claims ~~23-31~~22-30 comprising differentiating the cells chemically.

~~33~~32. The method according to claim ~~32~~31 wherein the differentiation comprises formation of embryoid bodies.

~~34~~33. The method according to claim ~~22-33~~21-32 wherein the differentiation of the cell is monitored by following a biomarker such as expression of at least one marker selected from the group of genes indicating pluripotency, early differentiation markers, and late differentiation markers.

~~35~~34. A kit comprising a first and a second container, the first container comprising the three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12, or the three-dimensional discontinuous entity according to any one of claims ~~1-9 or 13~~1-8 or 12 in dehydrated form such as dry powder, concentrated granulate, or concentrated hydrogel body, and the second container comprising cellulase.