49. A 3-D scaffold for culturing cells comprising a composite hydrogel of any of claims 1 to 44.

50. The 3-D scaffold of claim 50, wherein said cells are stem cells, including embryonic stem cells, human induced pluripotent stem (iPS) cells, progenitor cells and adult stem cells, cord blood stem cells, mesenchymal stem cells, adipose-derived stem cells, hematopoietic stem cells.

51. A device for drug delivery, preferably sustained or controlled release drug delivery, comprising a composite hydrogel of any of claims 1 to 44.

52. The device of claim 51, further comprising electrical components.

53. An implant or injectable agent comprising a composite hydrogel of any of claims 1 to 44.

54. A pharmaceutical or cosmetic composition comprising a composite hydrogel of any of claims 1 to 44.

55. A composite hydrogel of any of claims 1 to 44 for use in regenerative medicine or for use in tissue engineering and tissue regeneration, e.g. regeneration of adipose and cartilage tissue.

56. The composite hydrogel of any of claims 1 to 44 for use in the treatment of wounds or degenerative diseases of the skeletal system, e.g. degenerative disc disease, or urinary incontinence.

57. A composite hydrogel of any of claims 1 to 44 for cosmetic use.

58. An electronic device comprising a composite hydrogel of any of claims 1 to 44.

~~49. Use of a composite hydrogel of any of claims 1 to 44 as a device for drug delivery, preferably for sustained or controlled release drug delivery, or as an implant or as an injectable agent that gels *in situ*.~~

4950. A 3-D scaffold for culturing cells comprising a composite hydrogel of any of claims 1 to 44.

5051. The 3-D scaffold of claim 50, wherein said cells are stem cells, including embryonic stem cells, human induced pluripotent stem (iPS) cells, progenitor cells and adult stem cells, cord blood stem cells, mesenchymal stem cells, adipose-derived stem cells, hematopoietic stem cells.

512. A device for drug delivery, preferably sustained or controlled release drug delivery, comprising a composite hydrogel of any of claims 1 to 44.

523. The device of claim 512, further comprising electrical components.

534. An implant or injectable agent comprising a composite hydrogel of any of claims 1 to 44.

545. A pharmaceutical or cosmetic composition comprising a composite hydrogel of any of claims 1 to 44.

556. A composite hydrogel of any of claims 1 to 44 for use in regenerative medicine or for use in tissue engineering and tissue regeneration, e.g. regeneration of adipose and cartilage tissue.

567. The composite hydrogel of any of claims 1 to 44 for use in the treatment of wounds or degenerative diseases of the skeletal system, e.g. degenerative disc disease, or urinary incontinence.

578. A composite hydrogel of any of claims 1 to 44 for cosmetic use.

589. An electronic device comprising a composite hydrogel of any of claims 1 to 44.