Claims

1. A hydrogel comprising a peptide and gelatin, the peptide comprising a sequence having at least 8 amino acids with alternating hydrophobic amino acids (X) and hydrophilic amino acids (Y), wherein each hydrophobic amino acid is independently selected from isoleucine (I), valine (V) and leucine (L), each hydrophilic amino acid is independently selected from arginine (R), lysine (K), glutamic acid (E), and aspartic acid (D), wherein the hydrophilic amino acids are selected such that there is at least one arginine and at least one lysine, wherein the peptide comprises 8 or 12 amino acids.

2. The hydrogel according to claim 1, wherein the hydrophilic amino acids are selected such that there are at least two hydrophilic amino acids selected from glutamic acid and aspartic acid.

3. The hydrogel according to any one of claims 1 to 2, wherein four sequential hydrophilic amino acids (Y_1, Y_2, Y_3, and Y_4) in the sequence are selected such that Y_1 and Y_2 are each independently selected from glutamic acid and aspartic acid, and Y_3 and Y_4 are each independently selected from arginine and lysine.

4. The hydrogel according to claim 3, wherein Y_1 and Y_2 is glutamic acid, Y_3 is arginine, and Y_4 is lysine.

5. The hydrogel according to any one of claims 1 to 2, wherein six sequential hydrophilic amino acids (Y_5, Y_6, Y_1, Y_2, Y_3, and Y_4) in the sequence are selected such that Y_1 and Y_2 are each independently selected from glutamic acid and aspartic acid, and Y_5, Y_6, Y_3 and Y_4 are each independently selected from arginine and lysine.

6. The hydrogel according to claim 5, wherein Y_1 and Y_2 is glutamic acid, Y_5 and Y_3 is arginine, and Y_6 and Y_4 is lysine.

7. The hydrogel according to any one of claims 1 to 2, wherein the sequence comprises a SEQ ID selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15, and SEQ ID NO: 16.

8. The hydrogel according to any one of claims 1 to 7, wherein the peptide is present in 0.1 to 2 weight percent of the hydrogel.

9. The hydrogel according to claim 8, wherein the peptide is present in 0.2 to 1 weight percent of the hydrogel, preferably the peptide is present in 0.2 to 0.4 weight precent of the hydrogel.

10. The hydrogel according to any one of claims 1 to 9, wherein gelatin is present in 1 to 10 weight percent of the hydrogel.

11. The hydrogel according to claim 10, wherein gelatin is present in 1 to 6 weight percent of the hydrogel, preferably the gelatin is present in 2 to 3 weight percent of the hydrogel.

12. A method of preparing a hydrogel, the method comprising mixing a peptide and gelatin under suitable conditions to form the hydrogel, the peptide comprising a sequence having at least 8 amino acids with alternating hydrophobic amino acids and hydrophilic amino acids, wherein each hydrophobic amino acid is independently selected from isoleucine (I), valine (V) and leucine (L), each hydrophilic amino acid is independently selected from arginine (R), lysine (K), glutamic acid (E), and aspartic acid (D), wherein the hydrophilic amino acids are selected such that there is at least one arginine and at least one lysine.

13. The method according to claim 12, wherein the suitable conditions include at least one the following conditions: (a) a salt; and (b) a temperature of 20°C to 40°C.

14. A kit for preparing a hydrogel, the kit comprising a peptide and gelatin, the peptide comprising a sequence having at least 8 amino acids with alternating hydrophobic amino acids and hydrophilic amino acids, wherein each hydrophobic amino acid is independently selected from isoleucine (I), valine (V) and leucine (L), each hydrophilic amino acid is independently selected from arginine (R), lysine (K), glutamic acid (E), and aspartic acid (D), wherein the hydrophilic amino acids are selected such that there is at least one arginine and at least one lysine.

15. A method of culturing cells, the method comprising providing the hydrogel according to any one of claims 1 to 11; and incubating a cell and the hydrogel under suitable conditions to culture the cell.

16. The method according to claim 15, wherein the cell is a tumor cell, preferably a tumor spheroid.

17. The method according to claim 15, wherein the cell is a stem cell.

18. A method of determining an effect of one or more compounds on a plurality of cells, the method comprising culturing the plurality of cells according to any one of claims 15 to 16; adding the one or more compounds to the plurality of cells; and determining the effect of the one or more compounds on the plurality of cells.