In one aspect, there is provided a use of a hydrogel comprising a polysaccharide polymer network and collagen in the preparation of a medicament for the treatment of wounds in a subject in need thereof, wherein said hydrogel comprises a full interpenetrating polymer network comprising crosslinked collagen and gellan gum wherein the hydrogel comprises from 0.1% (w/v) to 10 % (w/v) and less than 0.2 % (w/v) of collagen and wherein the full interpenetrating polymer network is obtained by crosslinking the gellan gum in the presence of already crosslinked collagen.

In another preferred embodiment, said polysaccharide polymer is gellan gum. The hydrogel for use according to the invention preferably comprises from 0.1% (w/v) to 10 % (w/v) of gellan gum. In another preferred embodiment, the gellan gum of hydrogel is cross-linked by Mg2+. The hydrogel for use according to the invention can also further comprise an algae growth factor, preferably chlorella growth factor, more preferably between 0.1 and 1 % (w/v) of chlorella growth factor.

The present invention also relates to a wound dressing comprising the hydrogel according to the invention, and preferably an algae growth factor, more preferably chlorella growth factor. Said wound dressing can further comprise a pharmaceutically acceptable carrier. The present invention also relates to a wound dressing for use in the wound treatment in a subject in need thereof.

In another aspect, the invention relates to a hydrogel comprising a polysaccharide polymer network and collagen and algae growth factor, preferably chlorella growth factor.

Finally, the present invention relates to a cell culture system comprising a hydrogel as described above and a cell culture medium comprising an algae growth factor, preferably said cell culture medium is free of serum or albumin.

**BRIEF DESCRIPTION OF THE FIGURES**

**Figure 1. Cell viability of HDF encapsulated within gellan gum hydrogels formed with 0.4% gellan gum and 0.02% or 0.03% $MgCl_2$.** The mean (n = 3) and SD are shown.

**Figure 2: Physical characteristics of gellan gum-collagen interpenetrating polymer network (IPN) hydrogels.** SEM of the cross-section of the IPN hydrogel at A) 100x, B) 150x and C) 200x zoom (scale bar: 100 µm). D) Image of IPN hydrogel conforming to a cylindrical shape (scale bar: 1 cm). E) (from left to right) 0.4% gellan gum, 0.4% gellan gum & 1 mg/mL collagen mixture, 0.4% gellan gum & 1 mg/mL collagen mixture heated at 37 °C for 30 minutes

and 0.4% gellan gum & 1 mg/mL collagen mixture heated at 37 °C for 30 minutes then crosslinked with 0.02% $MgCl_2$. F) Degradation (weight loss) of IPN hydrogel over the duration of 28 days. The mean (n = 3) and standard error of mean (SEM) are shown. All samples were soaked in respective solutions and incubated at 37 °C with mild agitation at 60 rpm.

# CLAIMS

1. Use of a hydrogel comprising a polysaccharide polymer network and collagen in the preparation of a medicament for the treatment of wounds in a subject in need thereof, wherein said hydrogel comprises a full interpenetrating polymer network comprising crosslinked collagen and gellan gum wherein the hydrogel comprises from 0.1% (w/v) to 10 % (w/v) of gellan gum and less than 0.2 % (w/v) of collagen and wherein the full interpenetrating polymer network is obtained by crosslinking the gellan gum in the presence of already crosslinked collagen.

2. The use of claim 1, wherein the hydrogel has a storage modulus (G') as measured at 1 Hz at 25°C comprised between 100 to 5000 Pa.

3. The use of claim 1 or 2, wherein the hydrogel comprises less than 0.1 % (w/v) of collagen.

4. The use of claim 3, wherein the hydrogel comprises from 0.2% (w/v) to 2.5 % (w/v) of gellan gum.

5. The use according to any one of claims 1 to 4, wherein said gellan gum hydrogel is cross-linked by $Mg^{2+}$.

6. The use according to any one of claims 1 to 5, wherein said hydrogel further comprises an algae growth factor.

7. The use of claim 6, wherein said algae growth factor is a chlorella growth factor.

8. The use of claim 7, wherein the hydrogel comprises between 0.1 and 1% of chlorella growth factor.

9. A wound dressing comprising the hydrogel as defined in any one of claims 1 to 8.

10. A wound dressing comprising a hydrogel as defined in any one of claims 1 to 5 and algae growth factor, preferably chlorella growth factor.

11. A wound dressing of claim 9 or 10, further comprising a pharmaceutically acceptable carrier.

12. A wound dressing according to any one of claims 9 to 11 for use in the wound treatment in a subject in need thereof.

13. A cell culture system comprising a hydrogel as defined in any one of claims 1 to 6 and a cell culture medium comprising an algae growth factor.

14. The cell culture system of claim 13 wherein said cell culture medium is free of serum or albumin.