CLAIMS

WHAT IS CLAIMED IS:

1. A wound dressing material comprising a compound of Formula I:

M–L–R

Formula I

wherein

M is a gel-forming polymer;

R is a reporter molecule; and

L is a linker that is either absent or present, and L, when present, connects M and R.

2. The wound dressing material of claim 1, wherein the L is absent.

3. The wound dressing material of claim 2, wherein the M is covalently or non-covalently conjugated with R.

4. The wound dressing material of claim 1, wherein L is present.

5. The wound dressing material of claim 4, wherein the linker L is covalently or non-covalently conjugated, independently of each other, with M and R.

6. The wound dressing material of claim 1, wherein the reporter comprises an enzyme substrate.

7. The wound dressing material of claim 6, wherein the enzyme substrate is a sugar, a polysaccharide, a nucleic acid, an amide, a peptide, a protein, a lipid, or a derivative thereof or a combination thereof.

8. The wound dressing material of claim 7, wherein the enzyme substrate is a sugar, a polysaccharide, an amide, a peptide, a protein or a derivative thereof or a combination thereof.

9. The wound dressing material of claim 1, wherein the gel-forming polymer is selected from cellulose, carboxymethylcellulose, pectin, alginate, chitosan, hyaluronic acid, polysaccharide, or gum-derived polymer, or a derivative thereof or any mixture or a combination thereof.

10. The wound dressing material of claim 9, wherein the gel-forming polymer is carboxymethylcellulose or a salt thereof.

11. The wound dressing material of claim 9, wherein the gel-forming polymer comprises about 200 to about 4000 monomeric units.

12. The wound dressing material of claim 11, wherein the gel-forming polymer comprises about 500 to about 2000 monomeric units.

13. The wound dressing material of claim 1, wherein L comprises a neutral polymer which is an ethoxylated polyhydric alcohol, a polyvinyl pyrrolidone polymer, a polypropylene, a polyalkylene glycol, a polyamine or an ether, an amide, or an ester thereof.

14. The wound dressing material of claim 13, wherein L is a neutral polymer comprising 2-10 monomeric units of an ethoxylated polyhydric alcohol, a polyvinyl pyrrolidone polymer, a polypropylene, a polyalkylene glycol, a polyamine or an ether, an amide, or an ester thereof.

15. The wound dressing material of claim 13, wherein L comprises at least one polypropylene glycol subunit.

16. The wound dressing material of claims 1, wherein the reporter molecule comprises a detectable label.

17. The wound dressing material of claim 16, wherein the detectable label selected from the group consisting of a luminescent molecule, a chemiluminescent molecule, a fluorochrome, a fluorescent quenching agent, a lipid, a colored molecule, a radioisotope, a scintillant, biotin, avidin, streptavidin, protein A, protein G, an antibody or a fragment thereof, a polyhistidine, Ni2+, a Flag tag, a myc tag, a heavy metal, and an enzyme.

18. The wound dressing material of claim 15, wherein the reporter molecule comprises a fluorescent molecule selected from the group consisting of fluorescein, rhodamine, tetramethylrhodamine, R-phycoerythrin, Cy-3, Cy-5, Cy-7, Texas Red, Phar-Red, allophycocyanin (APC), fluorescein amine, eosin, dansyl, umbelliferone, 5-carboxyfluorescein (FAM), 2′7′-dimethoxy-4′5′-dichloro-6-carboxyfluorescein (JOE), 6-carboxyrhodamine (R6G), N,N,N′,N′-tetramethyl-6-carboxyrhodamine (TAMRA), 6-carboxy-X-rhodamine (ROX), 4-(4′-dimethylaminophenylazo) benzoic acid (DABCYL), 5-(2′-aminoethyl)aminonaphthalene-1-sulfonic acid (EDANS), 4-acetamido-4′-isothiocyanatostilbene-2, 2′disulfonic acid, acridine, acridine isothiocyanate, r-amino-N-(3-vinylsulfonyl)phenylnaphthalimide-3,5, disulfonate (Lucifer Yellow VS), N-(4-anilino-1-naphthyl)maleimide, anthranilamide, Brilliant Yellow, coumarin, 7-amino-4-methylcoumarin, 7-amino-4-trifluoromethylcouluarin (Coumarin 151), cyanosine, 4′, 6-diaminidino-2-phenylindole (DAPI), 5′,5″-diaminidino-2-phenylindole (DAPI), 5′,5″-dibromopyrogallol-sulfonephthalein (Bromopyrogallol Red), 7-diethylamino-3-(4′-isothiocyanatophenyl)-4-methylcoumarin diethylenetriamine pentaacetate, 4,4′-diisothiocyanatodihydro-stilbene-2,2′-disulfonic acid, 4,4′-diisothiocyanatostilbene-2,2′-disulfonic acid, 4-dimethylaminophenylazophenyl-4′-isothiocyanate (DABITC), eosin isothiocyanate, erythrosin B, erythrosin isothiocyanate, ethidium, 5-(4,6-dichlorotriazin-2-yl)aminofluorescein (DTAF), QFITC (XRITC), fluorescamine, IR144, IR1446, Malachite Green isothiocyanate, 4-methylumbelliferone, ortho-cresolphthalein, nitrotyrosine, pararosaniline, Phenol Red, B-phycoerythrin, o-phthaldialdehyde, pyrene, pyrene butyrate, succinimidyl 1-

pyrene butyrate, Reactive Red 4, lissamine rhodamine B sulfonyl chloride, rhodamine B, rhodamine 123, rhodamine X, sulforhodamine B, sulforhodamine 101, sulfonyl chloride derivative of sulforhodamine 101, tetramethyl rhodamine, riboflavin, rosolic acid, and terbium chelate derivatives.

19. The wound dressing material of claim 16, wherein the reporter comprises a detectable label and a quencher molecule.

20. The wound dressing material of claim 19, wherein the reporter comprising the quencher molecule is activated by an enzyme or a product thereof.

21. The wound dressing material of claim 16, wherein the reporter molecule or a portion thereof is released upon interaction with an enzyme.

22. The wound dressing material of claim 16, wherein the reporter comprises a substrate that is specific for a wound-specific enzyme.

23. The wound dressing material of claim 22, wherein the wound-specific enzyme is a protease.

24. The wound dressing material of claim 22, wherein the reporter comprises a substrate that is specific for a wound-specific enzyme selected from the group consisting of MMP-1 (collagenase), MMP-2 (gelatinase A), MMP-3 (stomelysin 1), MMP-8 (neutrophil collagenase), MMP-9 (gelatinase B), human neutrophil elastase (HNE), cathepsin G, urokinase-type plasminogen activator (uPA), and lysozyme.

25. The wound dressing material of claim 24, wherein the reporter comprises a substrate that is specific for MMP-2 and MMP-9 or a combination thereof.

26. A composition comprising the dressing material of claim 1, and further comprising a carrier.

27. A pharmaceutical composition comprising the composition of claim 26, and wherein the carrier is a pharmaceutically acceptable carrier.

28. The pharmaceutical composition of claim 27, which further comprises an antibiotic compound or a wound-healing peptide.

29. The pharmaceutical composition of claim 28, wherein the antibiotic is selected from the group consisting of β-lactams, fluoroquinolones, aminoglycosides, tetracyclines, glycylcyclines and polymyxins.

30. The pharmaceutical composition of claim 29, wherein the wound-healing peptide is fibroblast growth factor (FGF) or platelet derived growth factor (PDGF).

31. A method of diagnosing a status of a wound, comprising the steps of:

contacting the wound with the wound dressing material of claim 1 to permit conversion of the reporter molecule into a detectable signal; and,

detecting a signal.

32. The method of claim 31, wherein conversion of the reporter molecule into a detectable signal is carried out by a wound-specific protease.

33. The method of claim 32, wherein the wound specific protease is selected from the group consisting of MMP-1 (collagenase), MMP-2 (gelatinase A), MMP-3 (stomelysin 1), MMP-8 (neutrophil collagenase), MMP-9 (gelatinase B), human neutrophil elastase (HNE), cathepsin G, urokinase-type plasminogen activator (uPA), and lysozyme.

34. The method of claim 31, further comprising the step of determining a presence or absence of a chronic wound or an infected wound.

35. The method of claim 34, wherein the step of determining a presence or absence of a chronic would or an infected wound comprises the steps of: measuring a parameter in the wound, comparing the measured parameter to a threshold level, and making a determination that the wound is chronic or infected if the level of the parameter in the wound is higher than the threshold level.

36. The method of claim 35, wherein the parameter is an amount or activity of a wound-specific protease is selected from the group consisting of MMP-1 (collagenase), MMP-2 (gelatinase A), MMP-3 (stomelysin 1), MMP-8 (neutrophil collagenase), MMP-9 (gelatinase B), human neutrophil elastase (HNE), cathepsin G, urokinase-type plasminogen activator (uPA), and lysozyme.

37. A method of treating a chronic or an infected wound in a subject, comprising, administering the dressing material of claim 1 on the subject, wherein the dressing material is topically or dermally applied to the wound.

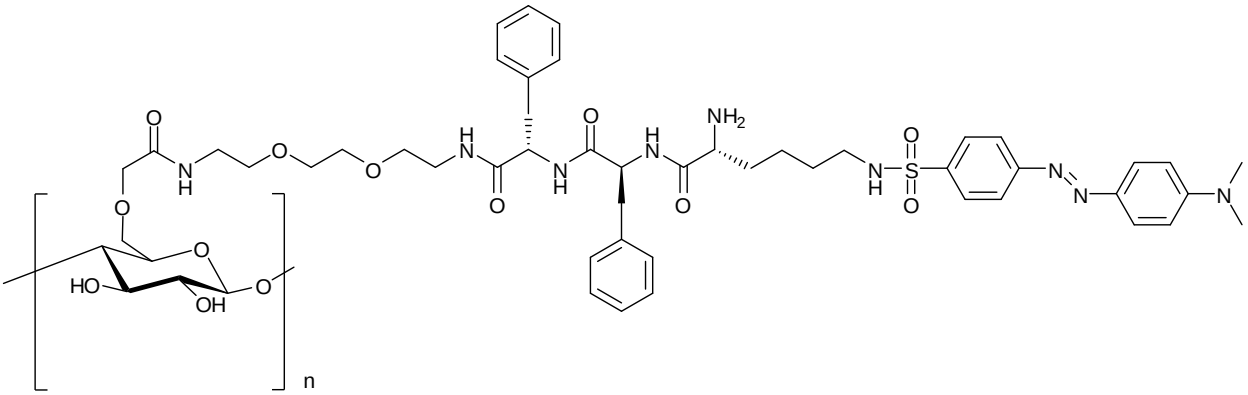
38. A method of making the compound of Formula I according to claim 1, wherein L is absent, comprising, conjugating the gel-forming polymer M with a reporter region R, thereby generating a compound of formula M–R, wherein, M and R are each, individually, as described in claim 1.

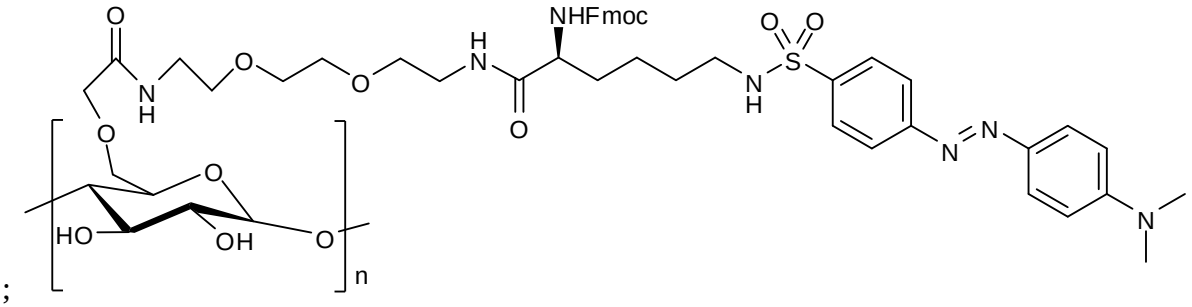
39. A method of making the compound of Formula I according to claim 1, wherein L is present, comprising, conjugating the gel-forming polymer M with a linker L, thereby generating a precursor compound M–L, and conjugating the precursor compound M–L with a reporter region R, thereby generating a compound of formula M–L–R, wherein M, L and R are each, individually, as described in claim 1.

40. A method of making the compound of Formula I according to claim 1, wherein L is present, comprising, conjugating the linker L with a reporter region R, thereby generating a precursor compound L–R, and conjugating the precursor compound L–R with a gel-forming

~~polymer M, thereby generating a compound of formula M–L–R, wherein M, L and R are each, individually, as described in claim 1.~~

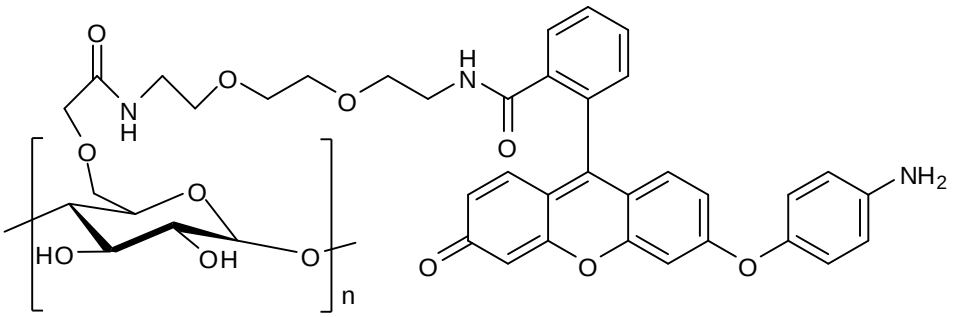
~~41.~~1. A wound dressing material selected from the group consisting of:



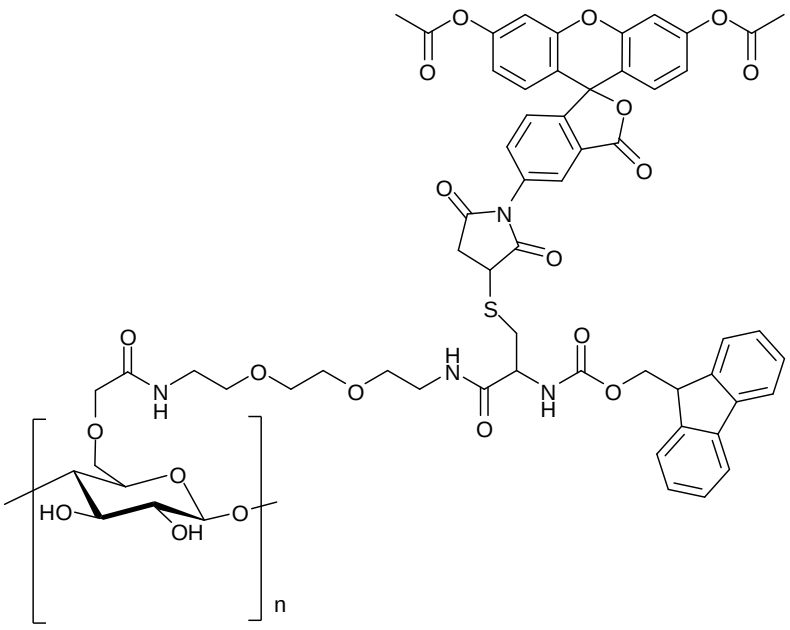


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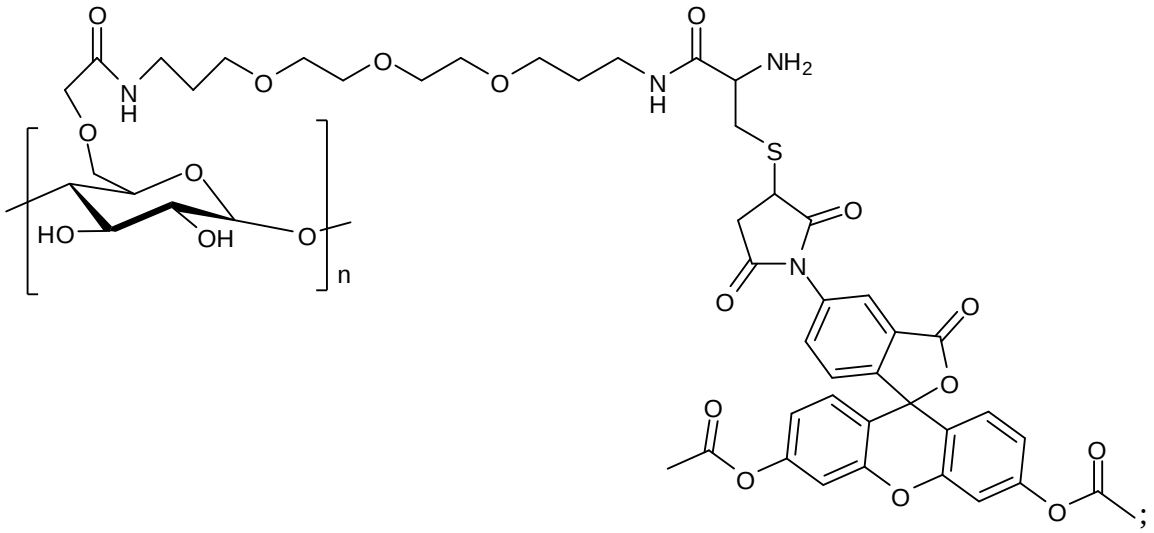
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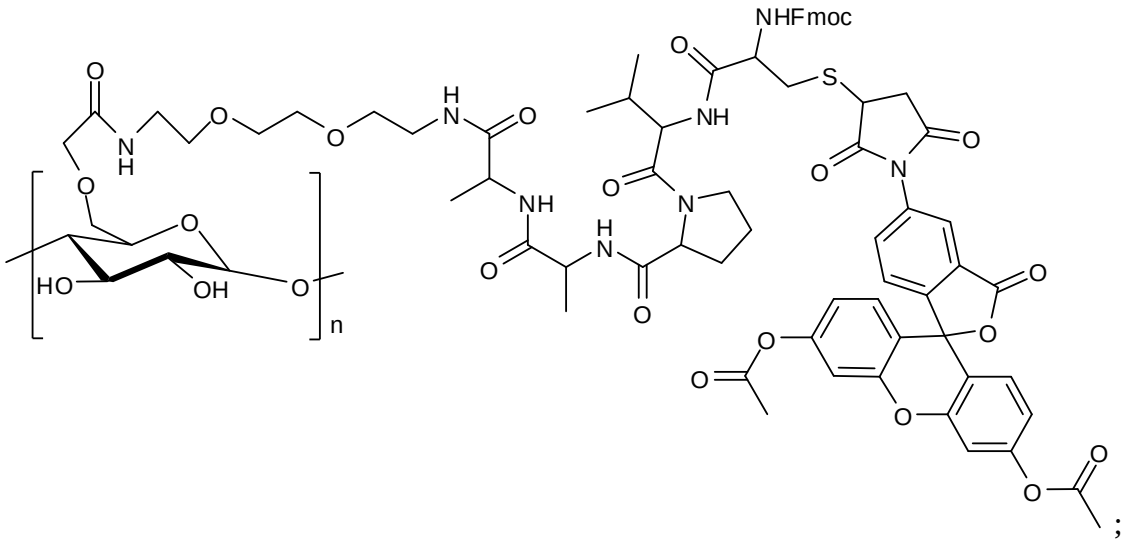


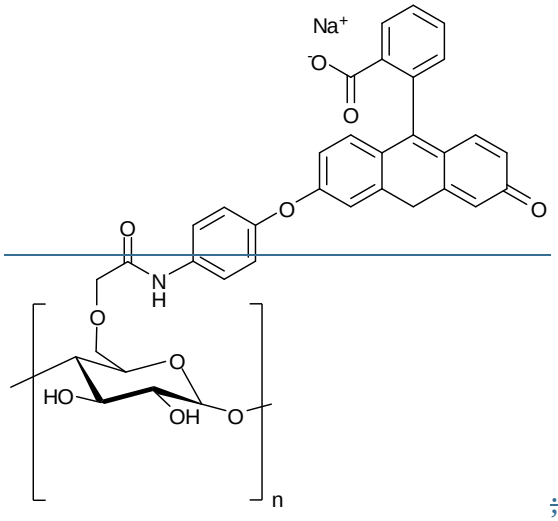
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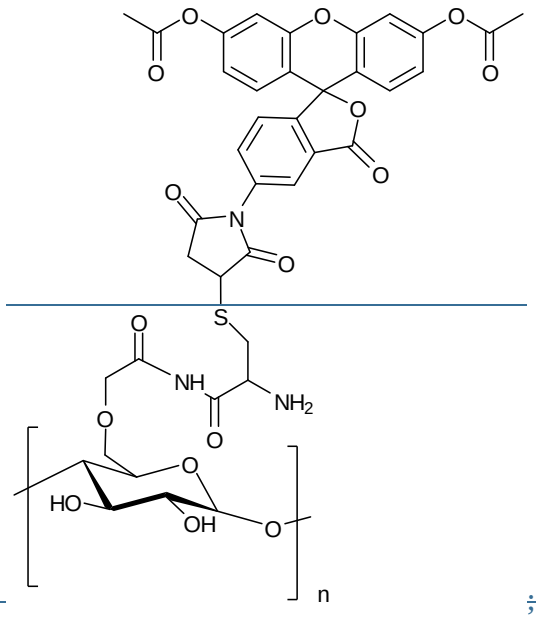
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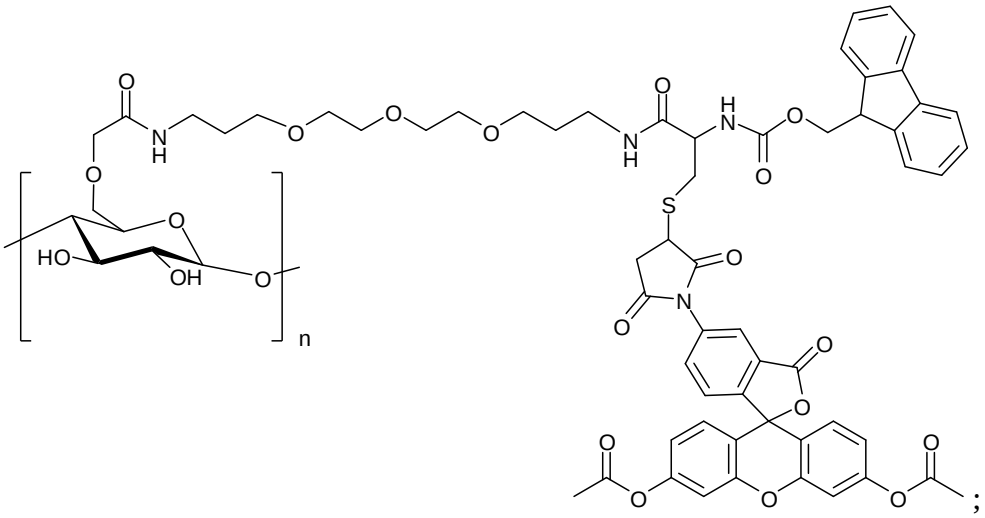




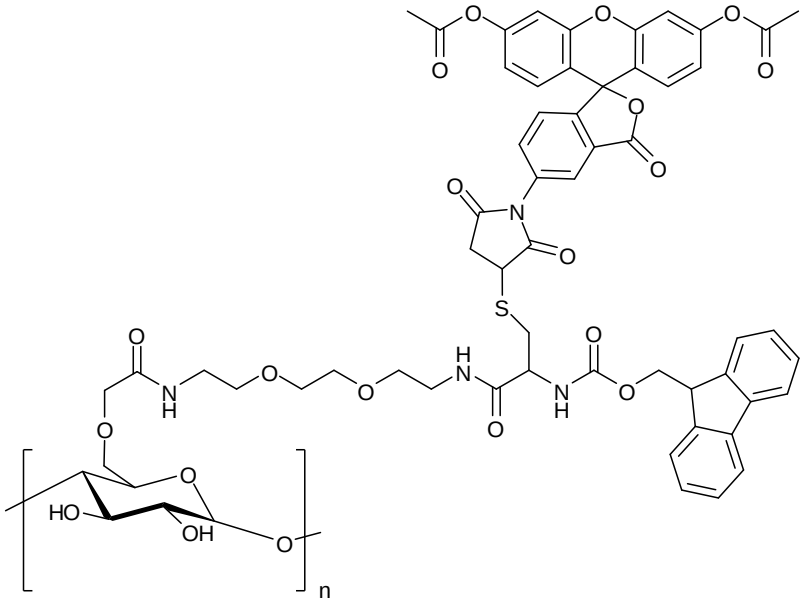
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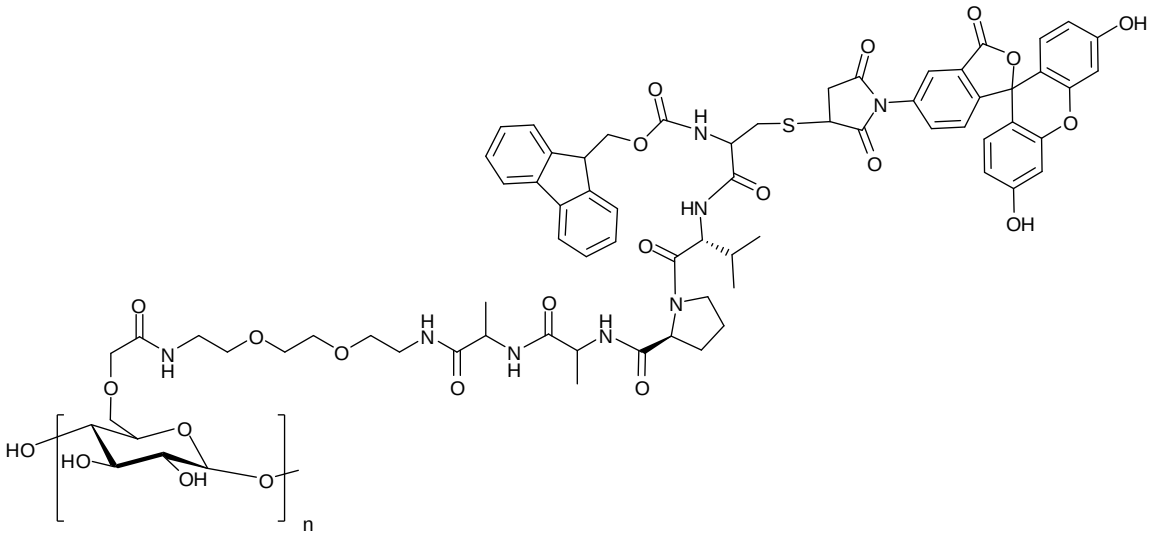
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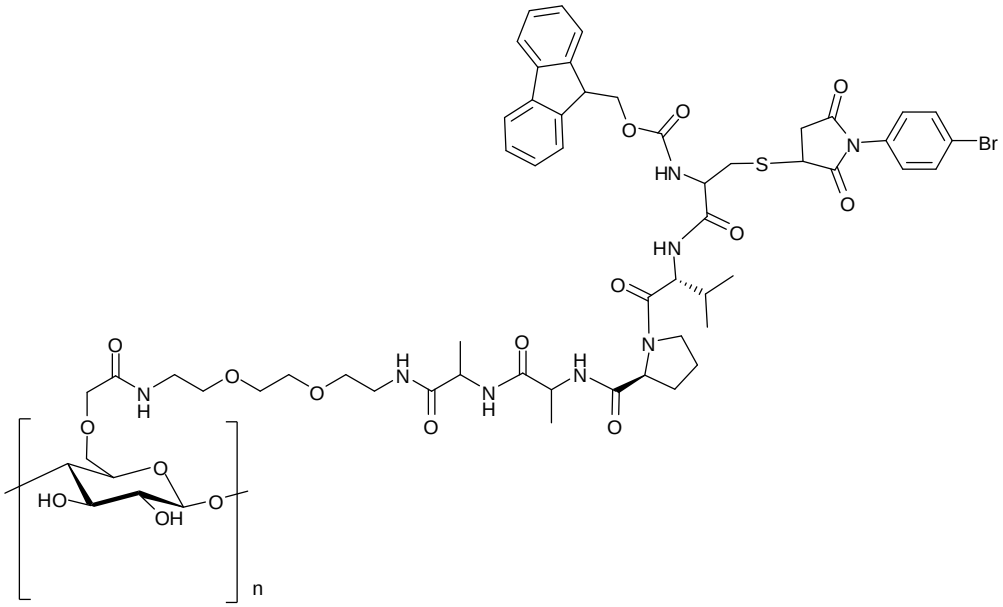
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; and



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wherein n = 200-4000.

~~42. A wound dressing material comprising a compound of Formula II:~~

~~M–L–PEP~~

~~Formula II~~

~~wherein~~

~~M is a gel-forming polymer;~~

~~PEP is a peptide and at least one amino acid; and~~

~~L is a linker that is either absent or present, and L, when present, connects M and PEP.~~

2. A wound dressing as claimed in claim 1 for use in a method of treatment or diagnosis of a wound.