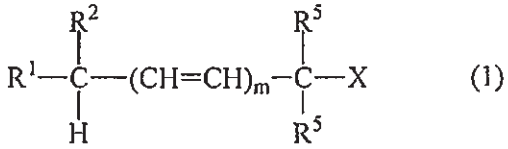
CLAIMS:

1. A hydrogel that is biodegradable under physiological conditions which hydrogel comprises one or more polymers crosslinked by a linker that decomposes by a beta elimination reaction,

wherein the linker, when disposed in the polymer, is a residue of formula (1)



(1)

wherein at least one of R^1, R^2, R^5 is coupled to through a first functional group to said one or more polymers and wherein X is coupled to a polymer through a second functional group,

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

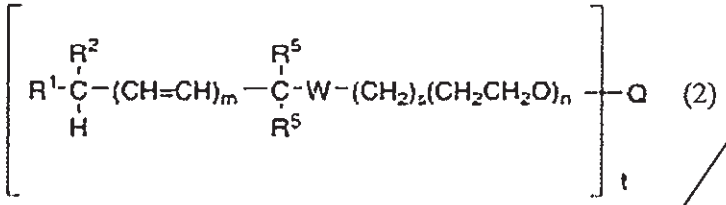
heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted,

wherein X is a carbonate, a carbamate, thioether, an ester or optionally substituted phenol wherein X is coupled to the polymer through said second functional group; or

wherein said linker is a residue of formula (2)



(2)

wherein at least two of said R^1, R^2, R^5 are coupled through functional groups to said one or more polymers;

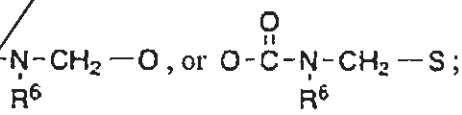
m is 0 or 1;

n is 1-1000;

s is 0-2;

t is 2,4, 8, 16 or 32;

Q is a core group having the valency t;

W is O(C=O)O, O(C=O)NH, O(C=O)S,  ;

wherein R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

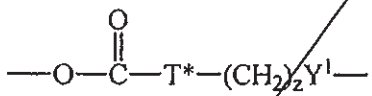
aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted.

2. The hydrogel of claim 1, wherein in formula (1), X is



wherein T* is O, S or NR^6 wherein R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

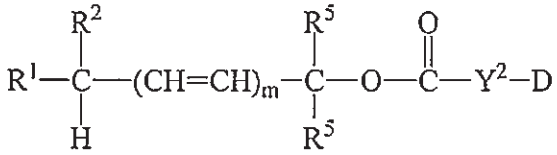
z is 1-6; and

Y^1 is absent or is OR^7 or SR^7, wherein R^7 is optionally substituted alkylene, optionally substituted phenylene or $(OCH_2CH_2)_p$, wherein p=1-1000, wherein Y^1 is coupled to a polymer through said second functional group.

3. The hydrogel of claim 1 or 2 wherein each said functional group independently comprises N_3, NH_2, NH-$CO_2{}^tBu$, SH, S^tBu, maleimide, CO_2H, $CO_2{}^tBu$, 1,3-diene, cyclopentadiene, furan, alkyne, cyclooctyne, acrylate, or acrylamide; and wherein when one functional group comprises N_3 the other does not comprise alkyne or cyclooctyne; when one functional group comprises SH the other does not comprise maleimide, acrylate, or acrylamide; when one functional group comprises NH_2, the other does not comprise CO_2H; when one functional group comprises 1,3-diene or cyclopentadiene the other does not comprise furan.

4. The hydrogel of any of claims 1-3 which further comprises a drug.

5. The hydrogel of claim 4 wherein said hydrogel includes a residue of formula (3)



(3)

wherein at least one of R^1, R^2, R^5 is coupled to a polymer;

m is 0 or 1;

D is a drug or prodrug;

Y^2 is NH or $NBCH_2$ wherein B is H, alkyl, arylalkyl, heteroaryl, or heteroarylalkyl, each optionally substituted; and

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted.

6. The hydrogel of any of claims 1-5 wherein

one of R^1 and R^2 is H and the other is CN or SO_2R^3 wherein R^3 is optionally substituted alkyl; aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring; and/or

one of R^5 is H and the other is $(CH_2)_n$ Z wherein n is 1-6 and Z is a functional group to connect to said polymer.

7. The hydrogel of any of claims 1-6, wherein the polymer is of the formula $[-(CH_2)_s(CH_2CH_2O)_n]_tQ$, wherein

n is 10-1000;

s is 0-2;

t is 2,4, 8, 16 or 32 and represents the number of arms of said polymer; and

Q is a core group having a valency=t,

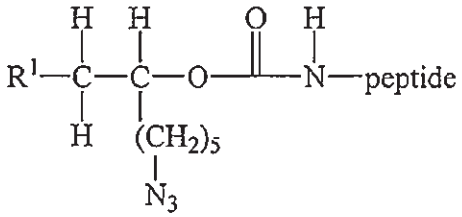
and said polymer is coupled to said linkers through functional groups at the terminus of each of said arms.

8. The hydrogel of claim 8 wherein t is 4 and each arm of said polymer is terminated by two orthogonal functional groups.

9. The hydrogel of claim 7 or 8 wherein Q is pentaerythritol, tripentaerythritol, or hexaglycerin.

10. The hydrogel of claim 6 wherein

the polymer is the residue of an 8-arm polyethylene glycol comprising a cyclooctyne group at the terminus of each arm wherein at least some of said arms have been coupled to



wherein R^1=CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring; or

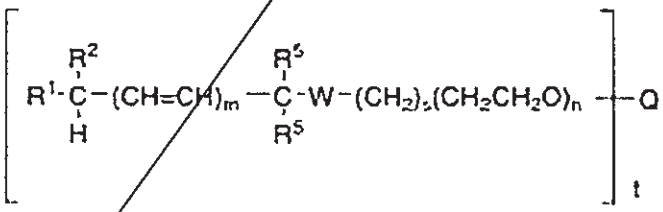
SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted.

11. The hydrogel of any of claims 6 – 10, wherein the cleavable crosslinking compound is the formula



wherein m is 0,

n is 90-110,

s is 0,

t is 4,

W is O(C=O)NH,

Q is $C(CH_2)_4$,

R^1 is CN or SO_2NR^3, wherein R^3 is optionally substituted alkyl;

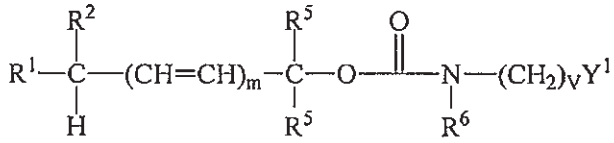
aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

R^2 and one of R^5 is H, and

the other R^5 is $(CH_2)_5N_3$.

12. A crosslinking compound of formula (4)



(4)

wherein at least two of R^1, R^2, and R^5 and Y further comprise a functional group capable of connecting to a polymer;

wherein

m is 0 or 1;

R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

v is 1-6;

Y^1 is H or is a bond if Y^1 comprises a functional group or is OR^7 or SR^7, wherein R^7 is optionally substituted alkylene, optionally substituted phenylene, or $(OCH_2CH_2)_p$, wherein p=1-1000;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

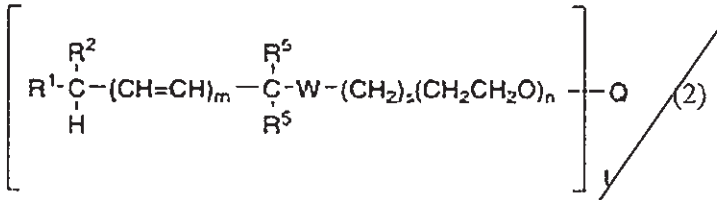
heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted;

or of formula (2)



(2)

wherein in at least two instances R^1, R^2, and/or R^5 further comprises a functional group capable of connecting to a polymer;

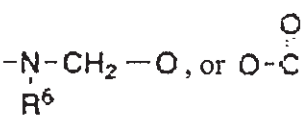
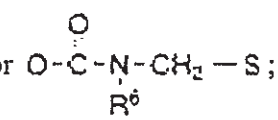
m is 0 or 1;

n is 1-1000;

s is 0-2;

t is 2, 4, 8, 16 or 32;

Q is a core group having a valency = t;

W is O(C=O)O, O(C=O)NH, O(C=O)S, , or ;

wherein R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted.

13. The crosslinking compound of claim 12 wherein each functional group capable of connection to a polymer comprises N_3, NH_2, NH-$CO_2{}^tBu$, SH, S^tBu, maleimide, CO_2H, $CO_2{}^tBu$, 1,3-diene, cyclopentadiene, furan, alkyne, cyclooctyne, acrylate, vinyl sulfone, vinyl sulfonamide, or acrylamide and wherein when one group comprises N_3 the other does not comprise alkyne or cyclooctyne; when one group comprises SH the other does not comprise maleimide, acrylate, or acrylamide; when one group comprises NH_2 the other does not comprise CO_2H; and when one group comprises a 1,3-diene or cyclopentadiene the other does not comprise furan.

14. The crosslinking compound of claim 12 or 13 wherein Q is pentaerythritol, tripentaerythritol, or hexaglycerin.

15. A method to prepare a biodegradable hydrogel of any of claims 1-11 said method comprising reacting polymer(s) with a cleavable crosslinker which crosslinker

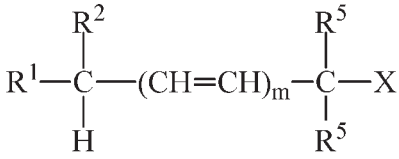
comprises at least two functional groups separated by a moiety that is cleaved by β- elimination under physiological conditions,

wherein said functional groups react with said polymer(s) to form said biodegradable hydrogel.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A hydrogel that is biodegradable under physiological conditions which hydrogel comprises one or more polymers crosslinked by a linker that decomposes by a beta elimination reaction,

wherein the linker, when disposed in the polymer, is a residue of formula (1)



(1)

wherein at least one of R^1, R^2, R^5 is coupled to through a first functional group to said one or more polymers and wherein X is coupled to a polymer through a second functional group,

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

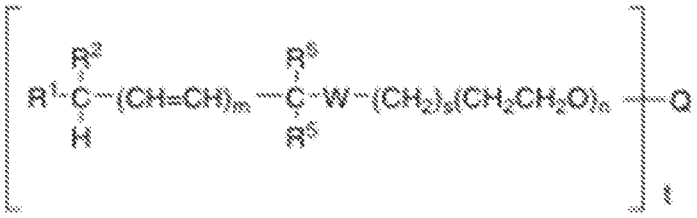
heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted,

wherein X is a carbonate, a carbamate, thioether, an ester or optionally substituted phenol wherein X is coupled to the polymer through said second functional group; or

wherein said linker is a residue of formula (2)



(2)

wherein at least two of said R^1, R^2, R^5 are coupled through functional groups to said one or more polymers;

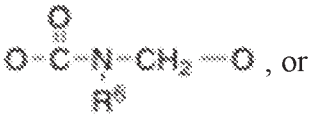
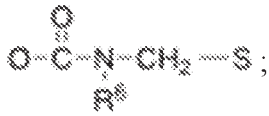
m is 0 or 1;

n is 1-1000;

s is 0-2;

t is 2, 4, 8, 16 or 32;

Q is a core group having the valency t;

W is O(C=O)O, O(C=O)NH, O(C=O)S,  , or  ;

wherein R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

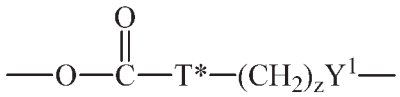
aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted.

2. The hydrogel of claim 1, wherein in formula (1), X is



wherein T* is O, S or NR^6 wherein R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

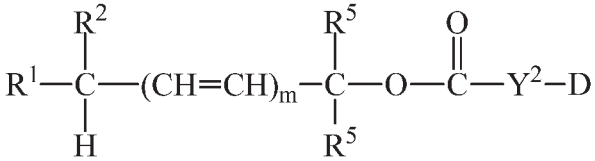
z is 1-6; and

Y^1 is absent or is OR^7 or SR^7, wherein R^7 is optionally substituted alkylene, optionally substituted phenylene or $(OCH_2CH_2)_p$, wherein p=1-1000, wherein Y^1 is coupled to a polymer through said second functional group.

3. The hydrogel of claim 1 or 2 wherein each said functional group independently comprises N_3, NH_2, NH-$CO_2{}^tBu$, SH, S^tBu, maleimide, CO_2H, $CO_2{}^tBu$, 1,3-diene, cyclopentadiene, furan, alkyne, cyclooctyne, acrylate, or acrylamide; and wherein when one functional group comprises N_3 the other does not comprise alkyne or cyclooctyne; when one functional group comprises SH the other does not comprise maleimide, acrylate, or acrylamide; when one functional group comprises NH_2, the other does not comprise CO_2H; when one functional group comprises 1,3-diene or cyclopentadiene the other does not comprise furan.

4. The hydrogel of any one of claims 1-3 which further comprises a drug.

5. The hydrogel of claim 4 wherein said hydrogel includes a residue of formula (3)



(3)

wherein at least one of R^1, R^2, R^5 is coupled to a polymer;

m is 0 or 1;

D is a drug or prodrug;

Y^2 is NH or $NBCH_2$ wherein B is H, alkyl, arylalkyl, heteroaryl, or heteroarylalkyl, each optionally substituted; and

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted.

6. The hydrogel of any one of claims 1-5 wherein

one of R^1 and R^2 is H and the other is CN or SO_2R^3 wherein R^3 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring; and/or

one of R^5 is H and the other is $(CH_2)_n$ Z wherein n is 1-6 and Z is a functional group to connect to said polymer.

7. The hydrogel of any one of claims 1-6, wherein the polymer is of the formula $[-(CH_2)_s(CH_2CH_2O)_n]_tQ$, wherein

n is 10-1000;

s is 0-2;

t is 2, 4, 8, 16 or 32 and represents the number of arms of said polymer; and

Q is a core group having a valency=t,

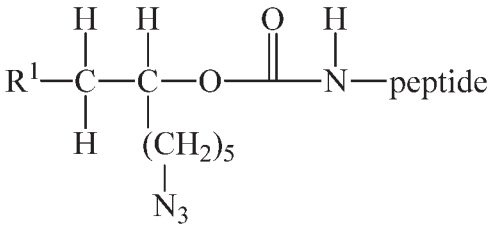
and said polymer is coupled to said linkers through functional groups at the terminus of each of said arms.

8. The hydrogel of claim 7 wherein t is 4 and each arm of said polymer is terminated by two orthogonal functional groups.

9. The hydrogel of claim 7 or 8 wherein Q is pentaerythritol, tripentaerythritol, or hexaglycerin.

10. The hydrogel of claim 6 wherein

the polymer is the residue of an 8-arm polyethylene glycol comprising a cyclooctyne group at the terminus of each arm wherein at least some of said arms have been coupled to



wherein R^1=CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring; or

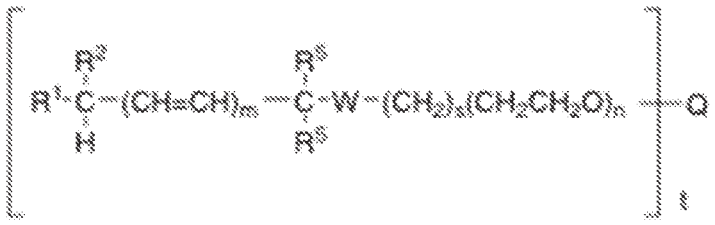
SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted.

11. The hydrogel of any one of claims 6 – 10, wherein the cleavable crosslinking compound is the formula



wherein m is 0,

n is 90-110,

s is 0,

t is 4,

W is O(C=O)NH,

Q is $C(CH_2)_4$,

R^1 is CN or SO_2NR^3, wherein R^3 is optionally substituted alkyl;

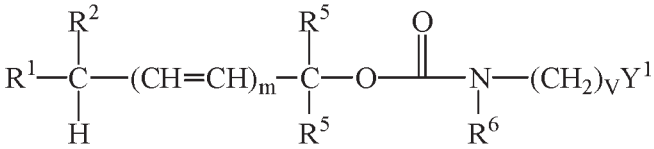
aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

R^2 and one of R^5 is H, and

the other R^5 is $(CH_2)_5N_3$.

12. A crosslinking compound of formula (4)



(4)

wherein at least two of R^1, R^2, and R^5 and Y further comprise a functional group capable of connecting to a polymer;

wherein

m is 0 or 1;

R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

v is 1-6;

Y^1 is H or is a bond if Y^1 comprises a functional group or is OR^7 or SR^7, wherein R^7 is optionally substituted alkylene, optionally substituted phenylene, or $(OCH_2CH_2)_p$,

wherein p=1-1000;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

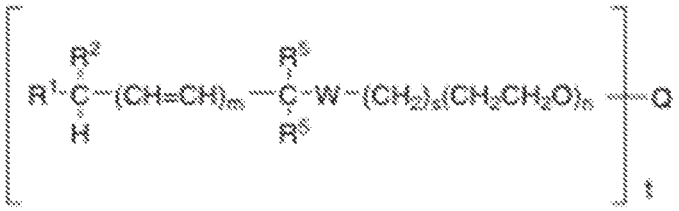
heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted;

or of formula (2)



(2)

wherein in at least two instances R^1, R^2, and/or R^5 further comprises a functional group capable of connecting to a polymer;

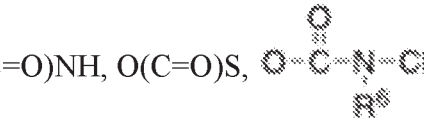
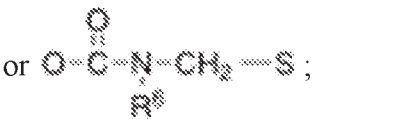
m is 0 or 1;

n is 1-1000;

s is 0-2;

t is 2, 4, 8, 16 or 32;

Q is a core group having a valency = t;

W is O(C=O)O, O(C=O)NH, O(C=O)S,  , or  ;

wherein R^6 is H, optionally substituted alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted arylalkyl, or optionally substituted heteroarylalkyl;

at least one or both R^1 and R^2 is independently CN; NO_2;

optionally substituted aryl;

optionally substituted heteroaryl;

optionally substituted alkenyl;

optionally substituted alkynyl;

COR^3 or SOR^3 or SO_2R^3 wherein

R^3 is H or optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted;

heteroaryl or heteroarylalkyl, each optionally substituted; or

OR^9 or NR^9_2 wherein each R^9 is independently H or optionally substituted alkyl, or both R^9 groups taken together with the nitrogen to which they are attached form a heterocyclic ring;

SR^4 wherein

R^4 is optionally substituted alkyl;

aryl or arylalkyl, each optionally substituted; or

heteroaryl or heteroarylalkyl, each optionally substituted;

wherein R^1 and R^2 may be joined to form a 3-8 membered ring; and

wherein one and only one of R^1 and R^2 may be H or may be alkyl, arylalkyl or heteroarylalkyl, each optionally substituted; and

each R^5 is independently H or is alkyl, alkenylalkyl, alkynylalkyl, $(OCH_2CH_2)_p$ O-alkyl wherein p=1-1000, aryl, arylalkyl, heteroaryl or heteroarylalkyl, each optionally substituted.

13. The crosslinking compound of claim 12 wherein each functional group capable of connection to a polymer comprises N_3, NH_2, NH-$CO_2{}^tBu$, SH, S^tBu, maleimide, CO_2H, $CO_2{}^tBu$, 1,3-diene, cyclopentadiene, furan, alkyne, cyclooctyne, acrylate, vinyl sulfone, vinyl sulfonamide, or acrylamide and wherein when one group comprises N_3 the other does not comprise alkyne or cyclooctyne; when one group comprises SH the other does not comprise maleimide, acrylate, or acrylamide; when one group comprises NH_2 the other does not comprise CO_2H; and when one group comprises a 1,3-diene or cyclopentadiene the other does not comprise furan.

14. The crosslinking compound of claim 12 or 13 wherein Q is pentaerythritol, tripentaerythritol, or hexaglycerin.

15. A method to prepare the biodegradable hydrogel of any one of claims 1-11 said method comprising reacting polymer(s) with a cleavable crosslinker which crosslinker

comprises at least two functional groups separated by a moiety that is cleaved by β-elimination under physiological conditions,

wherein said functional groups react with said polymer(s) to form said biodegradable hydrogel.