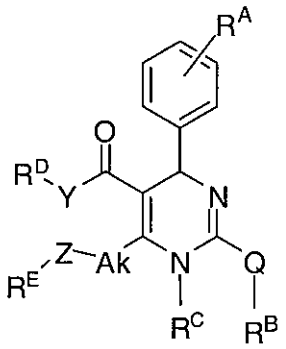
WHAT IS CLAIMED IS:

1. A compound having the formula (**I**)



(**I**)

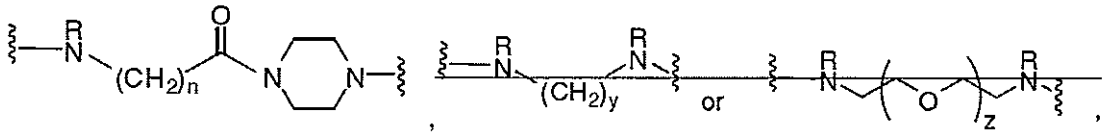
or a salt thereof, wherein:

Q is Ar^1 ~~or Ak_1~~;

Ar^1 is aryl~~, or heteroaryl~~

R^C is hydrogen;

Ak is ~~and Ak_1 are independently~~ C_1-C_6 alkylene;

Z is , where n is 1~~, 2, 3, 4, 5, or 6; y is 6, 7, 8, 9, 10, 11 or 12; z is 1, 2, 3, or 4~~; and R is H or alkyl;

R^D is ~~selected from the group consisting of~~ alkyl~~, heteroalkyl, alkenyl, and alkynyl, each of which is optionally substituted~~;

R^E is a FLUOROPHORE;

Y is O~~, S, or HN~~;

R^A represents ~~from~~ 0 ~~to 3~~ substituents ~~independently in each instance, halo or selected from the group consisting of alkyl, heteroalkyl, aryl, heteroaryl, amino and derivatives thereof, and hydroxyl and derivatives thereof, each of which is optionally substituted~~; and

R^B represents from 0 ~~to 3~~ substituents ~~independently in each instance, halogen or selected from the group consisting of alkyl, heteroalkyl, aryl, heteroaryl, amino and derivatives thereof, and hydroxyl and derivatives thereof, each of which is optionally substituted~~.

~~2. The compound of claim 1 wherein R^A represents 2-chloro-4-fluoro.~~

32. The compound of claim 1 wherein Q is Ar^1 where Ar^1 is 2-thiazolyl, 2-thienyl, 2-furanyl, 2-(1-methyl)imidazolyl, 2-pyrimidinyl, 2-naphthyl, 2-pyrrolidinyl, phenyl, 2-pyridyl, 3-pyridyl, or 4-pyridyl.

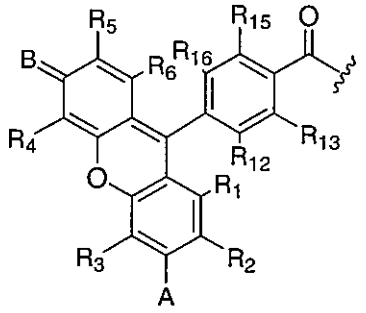
~~4. The compound of claim 1 wherein Q is Ar^1 where Ar^1 is 2-pyridyl.~~

53. The compound of claim 1 wherein Q is Ar^1 and R^B is absent.

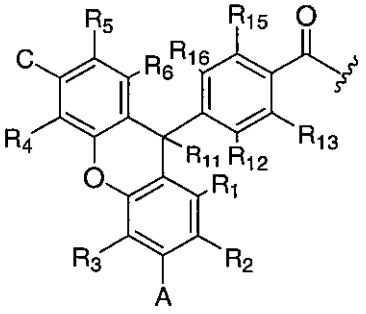
64. The compound of claim 1 wherein Y is O.

~~7. The compound of claim 1 wherein R^D is methyl.~~

85. The compound of claim 1 wherein R^E is



or



wherein

R_2, R_3, R_4 and R_5 are independently H, F, Cl, Br, I, CN; or C_1 - C_{18} alkyl, or C_1 - C_{18} alkoxy, where each alkyl or alkoxy is optionally further substituted by F, Cl, Br, I, a carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1 - C_6 alcohol; or --SO_3X where X is H or a counterion;

R_1 and R_6 are H; or R_1 taken in combination with R_2 or R_5 taken in combination with R_6 or both, form a fused aromatic six-membered ring that is optionally substituted one or more times by --SO_3X;

A is NR^8R^9; where R^8 and R^9 are independently H, C_1 - C_6 alkyl, C_1 - C_6 carboxyalkyl, C_1 - C_6 sulfoalkyl, a salt of C_1 - C_6 carboxyalkyl, or a salt of C_1 - C_6 sulfoalkyl, wherein the alkyl portions are optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1 -C_6 alkyl; or R_8 in combination with R_9 forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine, each of which is optionally substituted by methyl, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1 - C_6 alkyl;

or R_8 in combination with R_2, or R_9 in combination with R_3, or both, form a 5- or 6-membered ring that is saturated or unsaturated, and is optionally substituted by one or more C_1 -C_6 alkyls or --CH_2SO_3X moieties;

C is OR_{17} or $NR^{18}R^{19}$,

where R_{17} is H, or C_1 - C_{18} alkyl;

R^{18} and R^{19} are independently H, C_1 - C_6 alkyl, C_1 - C_6 carboxyalkyl, C_1 - C_6 sulfoalkyl, a salt of C_1 - C_6 carboxyalkyl, or a salt of C_1 - C_6 sulfoalkyl, wherein the alkyl portions are optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1 - C_6 alkyl; or R_{18} in combination with R_{19} forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine, each of which is optionally substituted by methyl, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1 - C_6 alkyl;

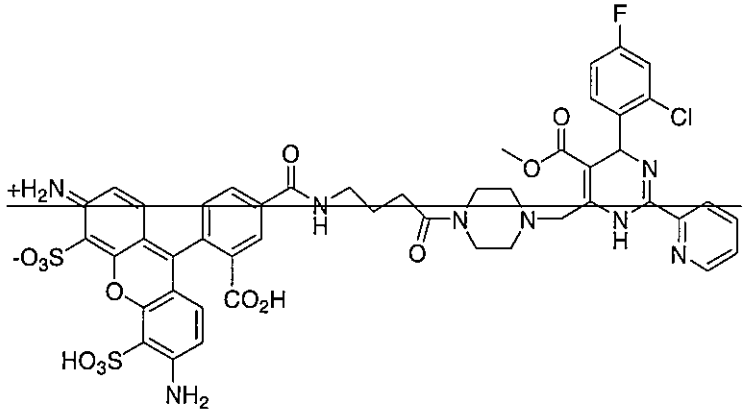
or R^{18} in combination with R_4, or R^{19} in combination with R_5, or both, form a 5- or 6-membered ring that is saturated or unsaturated, and is optionally substituted by one or more C_1 - C_6 alkyls or --CH_2SO_3X moieties;

B is O or $N^+R^{18}R^{19}$;

R_{12}, R_{13}, R_{15}, and R_{16} are independently H, F, Cl, Br, I, --SO_3X, a carboxylic acid, a salt of carboxylic acid, CN, nitro, hydroxy, azido, amino, hydrazino; or C_1 - C_{18} alkyl, C_1 - C_{18} alkoxy, C_1 - C_{18} alkylthio, C_1 - C_{18} alkanoylamino, C_1 - C_{18} alkylaminocarbonyl, C_2 - C_{36} dialkylaminocarbonyl, C_1 - C_{18} alkyloxycarbonyl, or C_6 - C_{18} arylcarboxamido, the alkyl or aryl portions of which are optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alcohol, --SO_3X, amino, alkylamino, dialkylamino or alkoxy, the alkyl portions of each having 1-6 carbons; or one pair of adjacent substituents R_{12} and R_{13} or R_{15} and R_{16}, when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid, or a salt of carboxylic acid; and

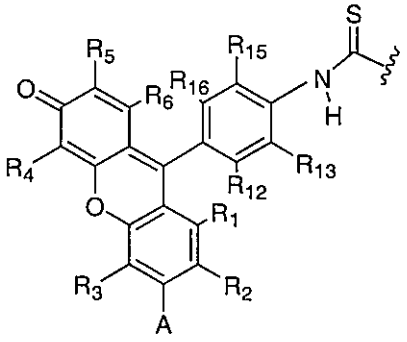
R_{11} is H, hydroxy, CN or a C_1 - C_6 alkoxy; or R_{11} in combination with R_{12} forms a 5- or 6-membered spirolactone ring or a 5- or 6-membered spirosultone ring that is optionally and independently substituted by H, F or CH_3.

~~9. The compound of claim 1 having the formula~~

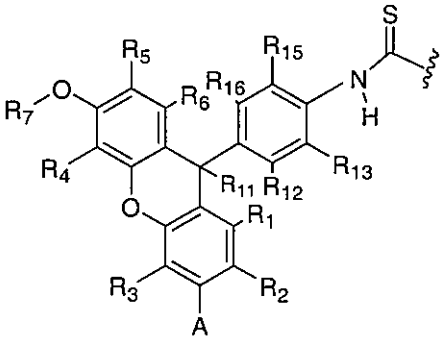


~~or a salt thereof.~~

~~10~~6. The compound of claim 1 wherein R^E is



or



wherein

R_1 and R_6 are independently H, F, Cl, Br, I, C_1 - C_{18} alkyl or C_1 -C_{18} alkoxy;

R_2, R_3, R_4 and R_5 are independently H, F, Cl, Br, I, CN; or C_1 - C_{18} alkyl, C_1 - C_{18} alkoxy or C_1 - C_{18} alkylthio, where each alkyl, alkoxy or alkylthio is optionally further

substituted by F, Cl, Br, I, sulfonic acid, salt of sulfonic acid, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, a carboxylic acid ester of --CH_2 --O--(C=O)--R_{18} where R_{18} is a C_1 - C_4 alkyl; or amino, alkylamino, dialkylamino, or alkoxy, the alkyl portions of which independently have 1-6 carbons; or one or both of R_3 and R_4 are --$CH_2N(CH_2\ COOR_{17})_2$, where R_{17} is H, a biologically compatible counterion, a linear or branched alkyl having 1-6 carbons, or --CH_2--O--(C=O)--R_{18};

A is OR_7 or NR^8R^9,

where each R_7 is independently H, C_1 - C_{18} alkyl, a C_1 - C_{18} acyl wherein each alkyl group independently has 1-6 carbons and is optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, a carboxylic acid ester of --CH_2--O--(C=O)--R_{18} ; or a trialkylsilyl wherein each alkyl group independently has 1-6 carbons;

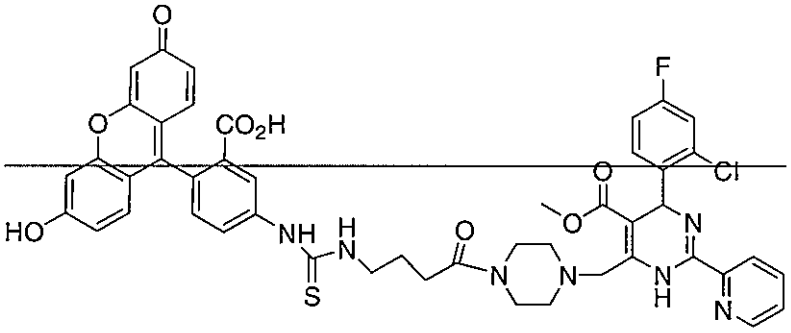
R^8 and R^9 are independently H, C_1 - C_6 alkyl, C_1 - C_6 carboxyalkyl, C_1 - C_6 sulfoalkyl, a salt of C_1 - C_6 carboxyalkyl, a salt of C_1 - C_6 sulfoalkyl, or C_1 - C_{18} acyl wherein the alkyl portions are optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, a carboxylic acid ester of --CH_2--O--(C=O)--R_{18} ; or R^8 in combination with R_2, or R^9 in combination with R_3, or both, form a saturated 5- or 6-membered ring that is optionally substituted by one or more methyls; or R^8 in combination with R^9 forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine, each of which is optionally substituted by methyl, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, or a carboxylic acid ester of --CH_2--O--(C=O)--R_{18};

R_{12}, R_{13}, R_{15} and R_{16} are independently H, F, Cl, Br, I; or sulfonic acid, salt of sulfonic acid, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, a carboxylic acid ester of --CH_2--O--(C=O)--R_{18}, CN, nitro, hydroxy, azido, amino, hydrazino; or C_1 -C_{18} alkyl, C_1 - C_{18} alkoxy, C_1 - C_{18} alkylthio, C_1 - C_{18} alkylamino, C_1 - C_{18} alkylester, C_1 -C_{18} alkylamido or C_1 -C_{18} arylamido, the alkyl or aryl portions of which are optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, a carboxylic acid ester of --CH_2--O--(C=O)--R_{18}, sulfonic acid, salt of sulfonic acid, amino, alkylamino, dialkylamino or alkoxy, the alkyl portions of each having 1-6 carbons; or one pair of adjacent substituents R_{12} and R_{13} or R_{15} and R_{16}, when taken in combination, form a fused 6-membered aromatic ring

that is optionally further substituted by carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alkyl, a carboxylic acid ester of --CH_2--O--(C=O)--R_{18}; and

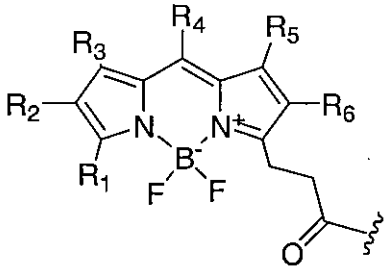
R_{11} is H, hydroxy, CN or a C_1 - C_6 alkoxy; or R_{11} in combination with R_{12} forms a 5- or 6-membered spirolactone ring or a 5- or 6-membered spirosultone ring that is optionally and independently substituted by H, F or CH_3.

~~11. The compound of claim 1having the formula~~



~~or a salt thereof.~~

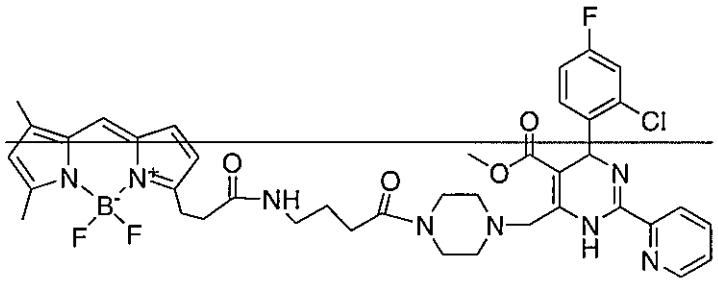
~~12~~7. The compound of claim 1 wherein R^E is



wherein

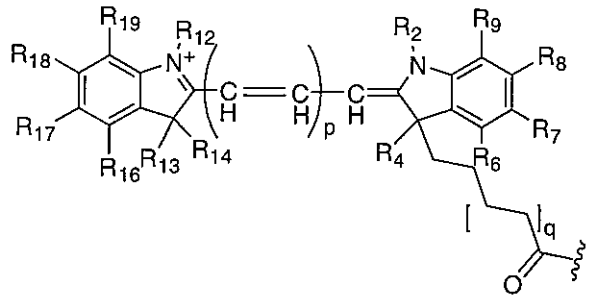
R_1, R_2, R_3, R_4, R_5, and R_6 are each independently H, halogen, alkyl, cycloalkyl, aryl, arylalkyl, acyl or sulfo.

~~13. The compound of claim 1 having the formula~~

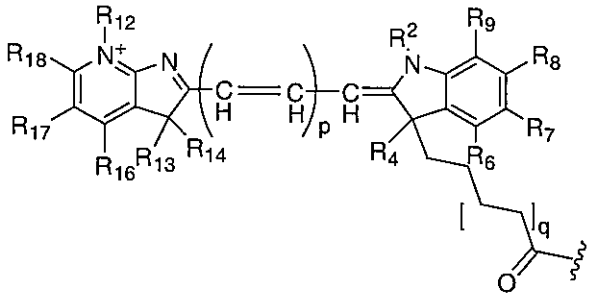


~~or a salt thereof.~~

~~148~~. The compound of claim 1 wherein R^E is



or



wherein

R_4 is C_1 - C_{22} alkyl or C_7 - C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by substituents selected from the group consisting of F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, or C_3 - C_{18} trialkylammonium;

R_2 is C_1 - C_{22} alkyl or C_7 - C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, C_2 - C_{12} dialkylamino, or C_3 - C_{18} trialkylammonium;

R_6 is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_7 is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and

hydroxyl;

R_8 is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_9 is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_{16} is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_{17} is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_{18} is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_{19} is H, amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

or a member independently selected from

R_6 in combination with R_7;

R_7 in combination with R_8;

R_8 in combination with R_9;

R_{16} in combination with R_{17};

R_{17} in combination with R_{18}; and

R_{18} in combination with R_{19}

together with the atoms to which they are joined, form an aromatic ring comprising --CH-- or --CR^1-- wherein R^1 is amino, sulfo, trifluoromethyl, halogen, C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, wherein each alkyl portion of which is optionally substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

p is 1, 2 or 3;

q is 0, 1, 2 or 3;

R_{12} is C_1 - C_{22} alkyl or C_7 - C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, C_2 - C_{12} dialkylamino, or C_3 - C_{18} trialkylammonium;

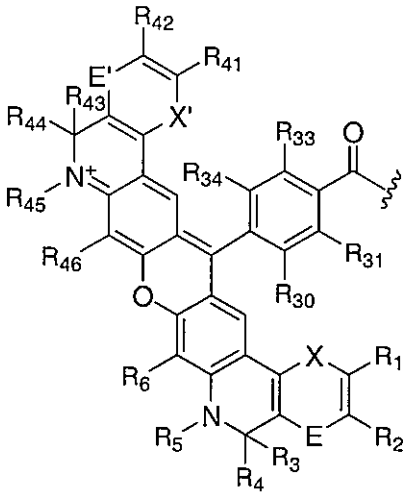
R_{13} is C_1 - C_{22} alkyl or C_7 - C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, or C_3 - C_{18} trialkylammonium;

R_{14} is C_1 - C_{22} alkyl or C_7 - C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1 - C_6 alkoxy, C_1 - C_6 alkylamino, or C_2 - C_{12} dialkylamino, or C_3 - C_{18} trialkylammonium;

or R_{13} and R_{14} taken in combination complete a five- or six-membered saturated or unsaturated ring that is optionally substituted; and

wherein sulfo is sulfonic acid or sulfonate.

~~15~~9. The compound of claim 1 wherein R^E is



wherein

R_1, R_2, R_6, R_{41}, R_{42}, and R_{46} are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid C_1 - C_6 alkyl, C_1 - C_6 alkoxy, aryl, heteroaryl, wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C_1 - C_6 alkyl, C_1 - C_6 perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or R_1 in combination with R_2, or R_{41} in combination with R_{42}, or both, forms a fused aromatic or heteroaromatic ring that is optionally sulfonated one or more times;

R_3, R_4, R_{43}, and R_{44} are independently selected from the group consisting of hydrogen, C_1 - C_6 alkyl, an aromatic or heteroaromatic ring, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said aromatic or heteroaromatic ring that is optionally substituted one or more times by C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_1 -C_6 perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or R_2 in combination with R_3, R_{42} in combination with R_{43}, or R_3 in combination with R_4, or R_{43} in combination with R_{44}, or any combination thereof, forms a 5- or 6-membered alicyclic ring;

R_5 and R_{45} are independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C_2 - C_6 alkyl, or heteroaryl, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C_1 - C_6 alkyl, C_1 - C_6 perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or R_4 in combination with R_5, or R_5 in combination with R_6, or R_{44} in

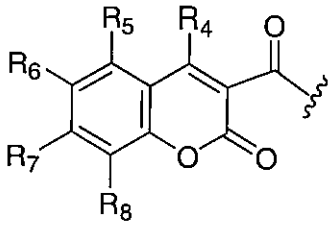
combination with R_{45}, or R_{45} in combination with R_{46}, or any combination thereof, forms a 5- or 6-membered alicyclic ring;

wherein E, E', X' and X is O, S, or NR^8 provided that E and X or E' and X' are not both present;

wherein R^8 is independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C_2 - C_6 alkyl, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; and

R_{30}, R_{31}, R_{33} and R_{34} are independently selected from the group consisting of hydrogen, F, Cl, Br, I, sulfonic acid, carboxylic acid, CN, nitro, hydroxy, azido, amino, hydrazino, or C_1 - C_{18} alkyl, C_1 - C_{18} alkoxy, C_1 - C_{18} alkylthio, C_1 - C_{18} alkanoylamino, C_1 - C_{18} alkylaminocarbonyl, C_2 - C_{36} dialkylaminocarbonyl, C_1 -C_{18} alkyloxycarbonyl, or C_7 - C_{18} arylcarboxamido, wherein said alkyl or aryl portions of said R_{30}, R_{31}, R_{33} and R_{34} are optionally substituted one or more times by substituents selected from the group consisting of F, Cl, Br, I, hydroxy, carboxylic acid, a carboxylic acid ester of a C_1 - C_6 alcohol, sulfonic acid, amino, C_1 - C_6 alkylamino, C_1 - C_6 dialkylamino and C_2 - C_6 alkoxy; or a pair of adjacent R_{30} and R_{31} or R_{33} and R_{34} substituents when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid.

~~16~~10. The compound of claim 1 wherein R^E is



wherein

R_4 is H, OH, CN, C_1-C_{18} alkyl, C_1-C_{18} perfluoroalkyl, sulfomethyl, biologically compatible salt of sulfomethyl, halomethyl, or aryl;

R_5 is H or C_1-C_6 alkoxy;

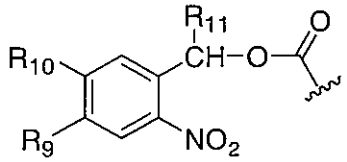
R_6 is H, methyl, halogen, or SO_3X;

R_7 is H or NR^1R^2; wherein

R_1 and R_2 are independently H, C_1 -C_{18} alkyl, C_6 -C_{18} aryl, C_1 -C_{18} alkanoyl, C_7-C_{18} arylalkanoyl;

or R_1 in combination with R_2 forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine;

or R_1 is a 2-nitrobenzyloxycarbonyl of the formula



wherein

R_9 and R_{10} are H, C_1 -C_6 alkoxy, or R_9 and R_{10} taken in combination are --O--CH_2--O--; and R_{11} is H, CH_3, a carboxylic acid or a biologically compatible salt of a carboxylic acid;

R_8 is H, halogen, SO_3X, C_1-C_6 alkoxy or C_1-C_6 alkyl; and

X is H, or a biologically compatible cation.

~~17. A composition comprising one or more compounds of any one of claims 1 to 16 in an amount effective for diagnosing, detecting, tracking, and/or competitively binding to HBV.~~

~~18. The composition of claim 16 further comprising one or more carriers, diluents, or excipients, or a combination thereof.~~

~~19. A method for detecting, diagnosing, and/or tracking HBV in cells and tissue, the method comprising the steps of:~~

~~a) incubating a mixture of cells and one or more compounds of any one of claims 1 to 16 or a composition thereof in an amount effective for diagnosing, detecting, and/or tracking HBV;~~

~~b) washing away any excess of said one or more compounds;~~

~~c) providing a stimulus to the mixture to elicit a fluorescent signal; and~~

~~d) analyzing the stimulated mixture.~~

~~20. The method of claim 19, wherein the cells are from tissue culture, fresh biopsy, fixed section, or other source.~~

~~21. The method of claim 19, wherein analyzing is accomplished by examining bulk fluorescence, by examining individual cells by fluorescence microscopy, by cell sorter, or by another mechanism.~~

~~22. A method for detecting, diagnosing, and/or tracking HBV cores in solution, the method comprising the steps of:~~

~~a) incubating a solution comprising clarifie~~

~~liquid to be tested and one or more compounds of any one~~

~~thereof in an amount effective for diagnosing, detecting, a~~

~~b) adjusting ionic strength, if necessary, to~~

~~purpose of detecting said assembly;~~

~~c) separating unbound said one or more co~~

~~compounds bound to HBV cores to create an unbound pha~~

~~and~~

~~d) analyzing the fluorescence associated wi~~

~~23. The method of claim 22, wherein se~~

~~compounds bound to HBV cores is accomplished by gel p~~

~~ultrafiltration, centrifugation, or other technique.~~

~~24. A method for conducting anti HBV~~

~~comprising the steps of:~~

d) analyzing the mixture for competitive binding by the anti-HBV drug candidate to the HAP pocket of HBV.

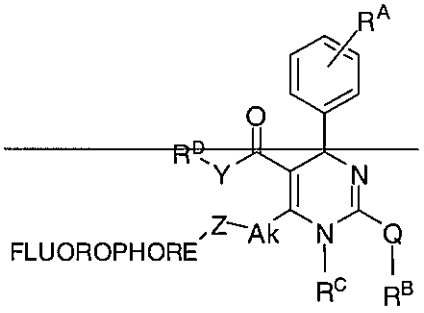
26. The method of claim 25, wherein separating unbound compounds from compounds bound to HBV cores is accomplished by gel permeation chromatography, ultrafiltration, centrifugation, or other technique.

27. A kit for detecting, diagnosing, and/or tracking HBV, and/or identifying compounds that competitively bind to the HAP pocket of HBV, the kit comprising:

a) one or more compounds of any one of claims 1 to 16 or a composition thereof; and

b) a solvent.

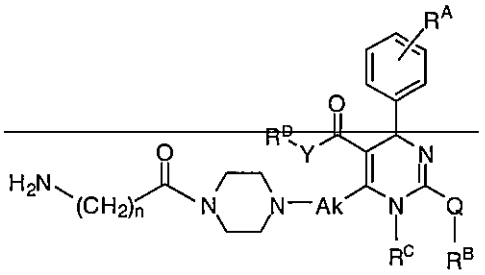
28. A process for preparing a compound having the structural formula (I)



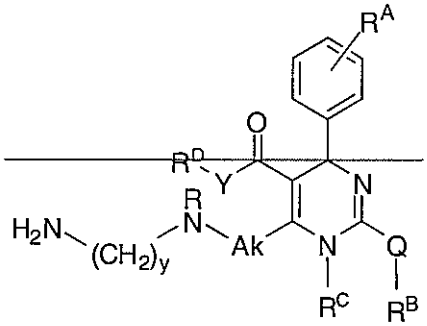
(I)

or a salt thereof, the process comprising:

(a) reacting a compound of structural formula

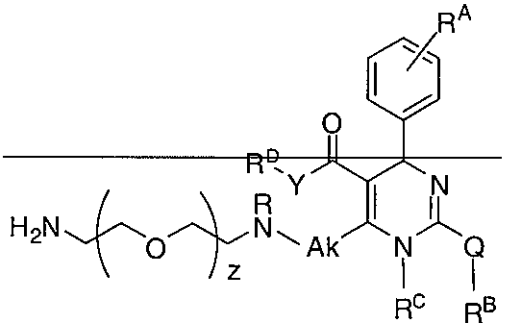


(II),



~~(II′),~~

~~or~~

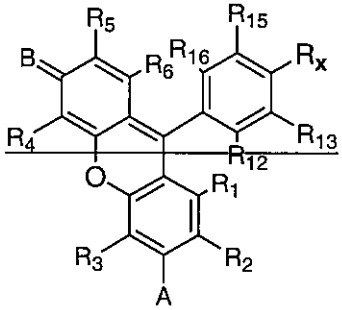


~~(II″)~~

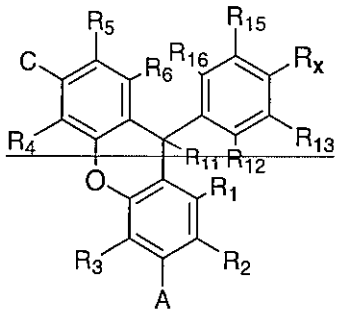
~~with a suitably activated FLUOROPHORE, wherein:~~

~~Q, R^C, R^D, Ar^1, Z, Ak, Ak_1, R, R^A, R^B, n, y and z are as defined in claim 1.~~

~~29. The process of claim 28 wherein the suitably activated FLUOROPHORE is~~



~~or~~



~~wherein~~

~~R_2, R_3, R_4 and R_5 are independently H, F, Cl, Br, I, CN; or C_1—C_{18} alkyl, or C_1—C_{18} alkoxy, where each alkyl or alkoxy is optionally further substituted by F, Cl, Br, I, a carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1—C_6 alcohol; or —SO_3X where X is H or a counterion;~~

~~R_1 and R_6 are H; or R_1 taken in combination with R_2 or R_5 taken in combination with R_6 or both, form a fused aromatic six-membered ring that is optionally substituted one or more times by —SO_3X;~~

~~A is NR^8R^9;~~

~~where R^8 and R^9 are independently H, C_1—C_6 alkyl, C_1—C_6 carboxyalkyl, C_1—C_6 sulfoalkyl, a salt of C_1—C_6 carboxyalkyl, or a salt of C_1—C_6 sulfoalkyl, wherein the alkyl portions are optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1—C_6 alkyl; or R_8 in combination with R_9 forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine, each of which is optionally substituted by methyl, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1—C_6 alkyl;~~

~~or R_8 in combination with R_2, or R_9 in combination with R_3, or both, form a 5- or 6-membered ring that is saturated or unsaturated, and is optionally substituted by one or more C_1—C_6 alkyls or —CH_2SO_3X moieties;~~

~~C is OR_{17} or $NR^{18}R^{19}$, where R_{17} is H, or C_1—C_{18} alkyl;~~

~~R^{18} and R^{19} are independently H, C_1—C_6 alkyl, C_1—C_6 carboxyalkyl, C_1—C_6 sulfoalkyl, a salt of C_1—C_6 carboxyalkyl, or a salt of C_1—C_6 sulfoalkyl, wherein the alkyl portions are optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1—C_6 alkyl; or R_{18} in combination with R_{19} forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a~~

piperazine, each of which is optionally substituted by methyl, carboxylic acid, a salt of carboxylic acid, or a carboxylic acid ester of a C_1—C_6 alkyl;

or R^{18} in combination with R_4, or R^{19} in combination with R_5, or both, form a 5- or 6-membered ring that is saturated or unsaturated, and is optionally substituted by one or more C_1—C_6 alkyls or —CH_2SO_3X moieties;

B is O or $N^+R^{18}R^{19}$;

R_{12}, R_{13}, R_{15}, and R_{16} are independently H, F, Cl, Br, I, —SO_3X, a carboxylic acid, a salt of carboxylic acid, CN, nitro, hydroxy, azido, amino, hydrazino; or C_1—C_{18} alkyl, C_1—C_{18} alkoxy, C_1—C_{18} alkylthio, C_1—C_{18} alkanoylamino, C_1—C_{18} alkylaminocarbonyl, C_2—C_{36} dialkylaminocarbonyl, C_1—C_{18} alkyloxycarbonyl, or C_6—C_{18} arylcarboxamido, the alkyl or aryl portions of which are optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1—C_6 alcohol, —SO_3X, amino, alkylamino, dialkylamino or alkoxy, the alkyl portions of each having 1-6 carbons; or one pair of adjacent substituents R_{12} and R_{13} or R_{15} and R_{16}, when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid, or a salt of carboxylic acid;

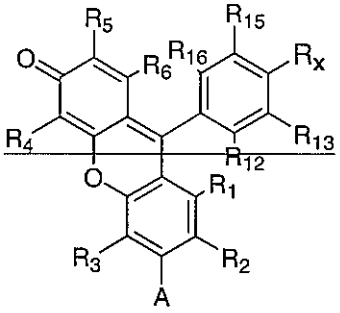
R_{11} is H, hydroxy, CN or a C_1—C_6 alkoxy; or R_{11} in combination with R_{12} forms a 5- or 6-membered spirolactone ring or a 5- or 6-membered spirosultone ring that is optionally and independently substituted by H, F or CH_3; and

R_x is a reactive group selected from the group consisting of an activated ester of a carboxylic acid, an acyl azide, an aldehyde, an alkyl halide, an anhydride, a sulfonyl halide, a malemide, an isocyanate, and an isothiocyanate.

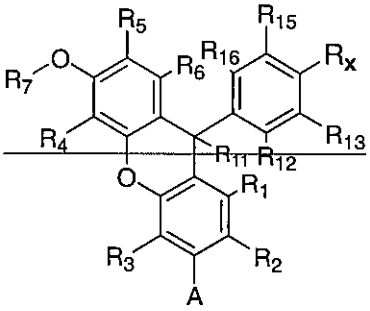
30. The process of claim 29 wherein the reactive group, Rx, is an activated ester of a carboxylic acid.

31. The process of claim 30 wherein the activated ester is a tetrafluorophenyl ester.

32. The process of claim 28 wherein the suitably activated FLUOROPHORE is



~~or~~



~~wherein~~

~~R_1 and R_6 are independently H, F, Cl, Br, I, C_1—C_{18} alkyl or C_1—C_{18} alkoxy;~~

~~R_2, R_3, R_4 and R_5 are independently H, F, Cl, Br, I, CN; or C_1—C_{18} alkyl, C_1—C_{18} alkoxy or C_1—C_{18} alkylthio, where each alkyl, alkoxy or alkylthio is optionally further substituted by F, Cl, Br, I, sulfonic acid, salt of sulfonic acid, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1—C_6 alkyl, a carboxylic acid ester of —CH_2—O—(C=O)—R_{18} where R_{18} is a C_1—C_4 alkyl; or amino, alkylamino, dialkylamino, or alkoxy, the alkyl portions of which independently have 1–6 carbons; or one or both of R_3 and R_4 are —$CH_2N(CH_2COOR_{17})_2$, where R_{17} is H, a biologically compatible counterion, a linear or branched alkyl having 1–6 carbons, or —CH_2—O—(C=O)—R_{18};~~

~~A is OR_7 or NR^8R^9;~~

~~where each R_7 is independently H, C_1—C_{18} alkyl, a C_1—C_{18} acyl wherein each alkyl group independently has 1–6 carbons and is optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1—C_6 alkyl, a carboxylic acid ester of —CH_2—O—(C=O)—R_{18}; or a trialkylsilyl wherein each alkyl group independently has 1–6 carbons;~~

~~R^8 and R^9 are independently H, C_1—C_6 alkyl, C_1—C_6 carboxyalkyl, C_1—C_6 sulfoalkyl, a salt of C_1—C_6 carboxyalkyl, a salt of C_1—C_6 sulfoalkyl, or C_1—C_{18} acyl wherein~~

the alkyl portions are optionally substituted by amino, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1–C_6 alkyl, a carboxylic acid ester of $-CH_2-O-(C=O)-R_{18}$; or R^8 in combination with R_2, or R^9 in combination with R_3, or both, form a saturated 5- or 6-membered ring that is optionally substituted by one or more methyls; or R^8 in combination with R^9 forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine, each of which is optionally substituted by methyl, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1–C_6 alkyl, or a carboxylic acid ester of $-CH_2-O-(C=O)-R_{18}$;

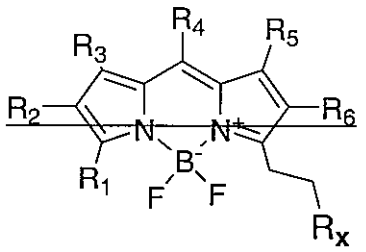
R_{12}, R_{13}, R_{15} and R_{16} are independently H, F, Cl, Br, I; or sulfonic acid, salt of sulfonic acid, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1–C_6 alkyl, a carboxylic acid ester of $-CH_2-O-(C=O)-R_{18}$, CN, nitro, hydroxy, azido, amino, hydrazino; or C_1–C_{18} alkyl, C_1–C_{18} alkoxy, C_1–C_{18} alkylthio, C_1–C_{18} alkylamino, C_1–C_{18} alkylester, C_1–C_{18} alkylamido or C_1–C_{18} arylamido, the alkyl or aryl portions of which are optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1–C_6 alkyl, a carboxylic acid ester of $-CH_2-O-(C=O)-R_{18}$, sulfonic acid, salt of sulfonic acid, amino, alkylamino, dialkylamino or alkoxy, the alkyl portions of each having 1-6 carbons; or one pair of adjacent substituents R_{12} and R_{13} or R_{15} and R_{16}, when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid, a salt of carboxylic acid, a carboxylic acid ester of a C_1–C_6 alkyl, a carboxylic acid ester of $-CH_2-O-(C=O)-R_{18}$;

R_{11} is H, hydroxy, CN or a C_1–C_6 alkoxy; or R_{11} in combination with R_{12} forms a 5- or 6-membered spirolactone ring or a 5- or 6-membered spirosultone ring that is optionally and independently substituted by H, F or CH_3; and

R_X is a reactive group selected from the group consisting of an activated ester of a carboxylic acid, an acyl azide, an aldehyde, an alkyl halide, an anhydride, a sulfonyl halide, a malemide, an isocyanate, and an isothiocyanate.

33. The process of claim 32 wherein the reactive group, Rx, is an isothiocyanate.

34. The process of claim 28 wherein the suitably activated FLUOROPHORE is



~~wherein~~

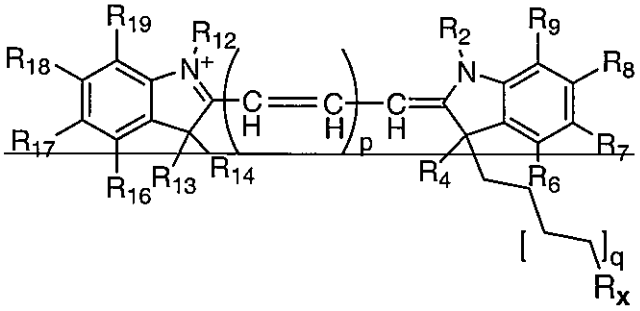
~~R_1, R_2, R_3, R_4, R_5, and R_6 are each independently H, halogen, alkyl, cycloalkyl, aryl, arylalkyl, acyl or sulfo; and~~

~~R_x is a reactive group selected from the group consisting of an activated ester of a carboxylic acid, an acyl azide, an aldehyde, an alkyl halide, an anhydride, a sulfonyl halide, a malemide, an isocyanate, and an isothiocyanate.~~

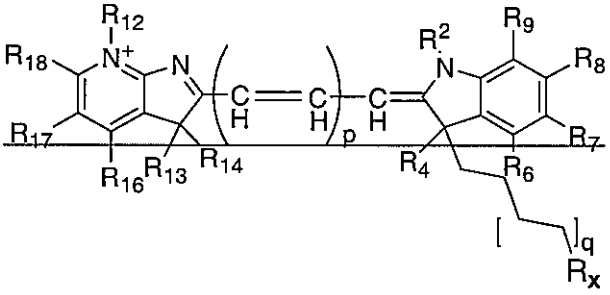
~~35. The process of claim 34 wherein the reactive group, Rx, is an activated ester of a carboxylic acid.~~

~~36. The process of claim 35 wherein the activated ester is a succinimidyl ester.~~

~~37. The process of claim 28 wherein the suitably activated FLUOROPHORE is~~



~~or~~



~~wherein~~

~~R_4 is C_1—C_{22} alkyl or C_7—C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by substituents selected from the group consisting of F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, or C_3—C_{18} trialkylammonium;~~

~~R_2 is C_1—C_{22} alkyl or C_7—C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1—C_6 alkoxy, C_1—C_6 alkylamino, C_2—C_{12} dialkylamino, or C_3—C_{18} trialkylammonium;~~

~~R_6 is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;~~

~~R_7 is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;~~

~~R_8 is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;~~

~~R_9 is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;~~

~~R_{16} is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;~~

~~R_{17} is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further~~

substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_{18} is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

R_{19} is H, amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, each alkyl portion of which is optionally further substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

or a member independently selected from

R_6 in combination with R_7;

R_7 in combination with R_8;

R_8 in combination with R_9;

R_{16} in combination with R_{17};

R_{17} in combination with R_{18}; and

R_{18} in combination with R_{19}

together with the atoms to which they are joined, form an aromatic ring comprising —CH— or —CR^+— wherein R^+ is amino, sulfo, trifluoromethyl, halogen, C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, wherein each alkyl portion of which is optionally substituted by substituents selected from the group consisting of carboxy, sulfo, amino, and hydroxyl;

p is 1, 2 or 3;

q is 0, 1, 2 or 3;

R_{12} is C_1—C_{22} alkyl or C_7—C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1—C_6 alkoxy, C_1—C_6 alkylamino, C_2—C_{12} dialkylamino, or C_3—C_{18} trialkylammonium;

R_{13} is C_1—C_{22} alkyl or C_7—C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from the group consisting of N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I,

~~hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, or C_3—C_{18} trialkylammonium;~~

~~R_{14} is C_1—C_{22} alkyl or C_7—C_{22} arylalkyl, each alkyl portion of which optionally incorporates up to six hetero atoms, selected from N, O and S, and each alkyl portion of which is optionally substituted one or more times by F, Cl, Br, I, hydroxy, carboxy, sulfo, phosphate, amino, sulfate, phosphonate, cyano, nitro, azido, C_1—C_6 alkoxy, C_1—C_6 alkylamino, or C_2—C_{12} dialkylamino, or C_3—C_{18} trialkylammonium;~~

~~or R_{13} and R_{14} taken in combination complete a five- or six-membered saturated or unsaturated ring that is optionally substituted;~~

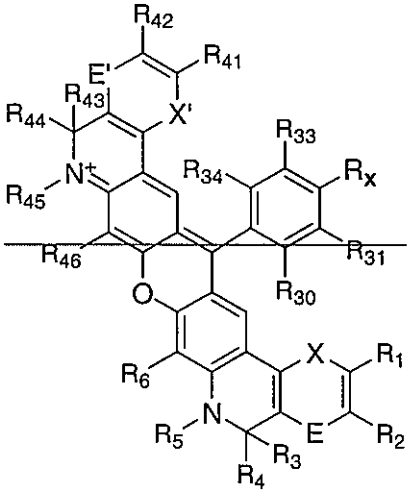
~~sulfo is sulfonic acid or sulfonate; and~~

~~R_X is a reactive group selected from the group consisting of an activated ester of a carboxylic acid, an acyl azide, an aldehyde, an alkyl halide, an anhydride, a sulfonyl halide, a maleimide, an isocyanate, and an isothiocyanate.~~

~~38. The process of claim 37 wherein the reactive group, Rx, is an activated ester of a carboxylic acid.~~

~~39. The process of claim 38 wherein the activated ester is a succinimidyl ester.~~

~~40. The process of claim 28 wherein the suitably activated FLUOROPHORE is~~



~~wherein:~~

~~R_1, R_2, R_6, R_{41}, R_{42}, and R_{46} are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid C_1—C_6 alkyl, C_1—C_6~~

alkoxy, aryl, heteroaryl, wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C_1—C_6 alkyl, C_1—C_6 perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or R_1 in combination with R_2, or R_{41} in combination with R_{42}, or both, forms a fused aromatic or heteroaromatic ring that is optionally sulfonated one or more times;

R_3, R_4, R_{43}, and R_{44} are independently selected from the group consisting of hydrogen, C_1—C_6 alkyl, an aromatic or heteroaromatic ring, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said aromatic or heteroaromatic ring that is optionally substituted one or more times by C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or R_2 in combination with R_3, R_{42} in combination with R_{43}, or R_3 in combination with R_4, or R_{43} in combination with R_{44}, or any combination thereof, forms a 5- or 6-membered alicyclic ring;

R_5 and R_{45} are independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C_2—C_6 alkyl, or heteroaryl, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C_1—C_6 alkyl, C_1—C_6 perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or R_4 in combination with R_5, or R_5 in combination with R_6, or R_{44} in combination with R_{45}, or R_{45} in combination with R_{46}, or any combination thereof, forms a 5- or 6-membered alicyclic ring;

wherein E, E', X' and X is O, S, or NR^8 provided that E and X or E' and X' are not both present;

wherein R^8 is independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C_2—C_6 alkyl, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen;

R_{30}, R_{31}, R_{33} and R_{34} are independently selected from the group consisting of hydrogen, F, Cl, Br, I, sulfonic acid, carboxylic acid, CN, nitro, hydroxy, azido, amino, hydrazino, or C_1—C_{18} alkyl, C_1—C_{18} alkoxy, C_1—C_{18} alkylthio, C_1—C_{18} alkanoylamino, C_1—C_{18} alkylaminocarbonyl, C_2—C_{36} dialkylaminocarbonyl, C_1—C_{18} alkyloxycarbonyl, or C_7—C_{18} arylcarboxamido, wherein said alkyl or aryl portions of said R_{30}, R_{31}, R_{33} and R_{34} are optionally substituted one or more times by substituents selected from the group consisting of

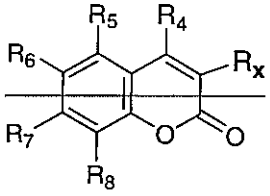
F, Cl, Br, I, hydroxy, carboxylic acid, a carboxylic acid ester of a C_1–C_6 alcohol, sulfonic acid, amino, C_1–C_6 alkylamino, C_1–C_6 dialkylamino and C_2–C_6 alkoxy; or a pair of adjacent R_{30} and R_{31} or R_{33} and R_{34} substituents when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid; and

R_x is a reactive group selected from the group consisting of an activated ester of a carboxylic acid, an acyl azide, an aldehyde, an alkyl halide, an anhydride, a sulfonyl halide, a maleimide, an isocyanate, and an isothiocyanate.

41. The process of claim 40 wherein the reactive group, Rx, is an activated ester of a carboxylic acid.

42. The process of claim 41 wherein the activated ester is a succinimidyl ester.

43. The process of claim 28 wherein the suitably activated FLUOROPHORE is



wherein

R_4 is H, OH, CN, C_1–C_{18} alkyl, C_1–C_{18} perfluoroalkyl, sulfomethyl, biologically compatible salt of sulfomethyl, halomethyl, or aryl;

R_5 is H or C_1–C_6 alkoxy;

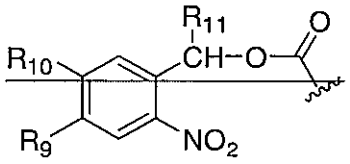
R_6 is H, methyl, halogen, or SO_3X;

R_7 is H or NR^1R^2; wherein

R_1 and R_2 are independently H, C_1–C_{18} alkyl, C_6–C_{18} aryl, C_1–C_{18} alkanoyl, C_7–C_{18} arylalkanoyl;

or R_1 in combination with R_2 forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine;

or R_1 is a 2-nitrobenzyloxycarbonyl of the formula



wherein

R_9 and R_{10} are H, C_1–C_6 alkoxy, or R_9 and R_{10} taken in combination are –O–CH_2–O–; and

R_{11} is H, CH_3, a carboxylic acid or a biologically compatible salt of a carboxylic acid;

R_8 is H, halogen, SO_3X, C_1–C_6 alkoxy or C_1–C_6 alkyl;

X is H, or a biologically compatible cation; and

R_x is a reactive group selected from the group consisting of an activated ester of a carboxylic acid, an acyl azide, an aldehyde, an alkyl halide, an anhydride, a sulfonyl halide, a malemide, an isocyanate, and an isothiocyanate.

44. The process of claim 43 wherein the reactive group, Rx, is an activated ester of a carboxylic acid.

45. The process of claim 44 wherein the activated ester is a succinimidyl ester.

46. The compound, composition, method, kit or process of any one of the preceding claims wherein Q is Ar^+, where Ar^+ is pheny, 2-pyridyl, 3-pyridyl, or 4-pyridyl.