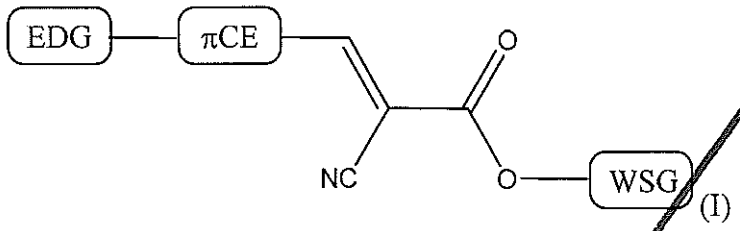
WHAT IS CLAIMED IS:

1. A compound having the structure of Formula (I),



(I)

wherein

EDG is an electron donor group;

πCE is a pi-conjugation element; and

WSG is a water soluble group.

2. The compound according to claim 1, wherein said EDG is R^1-substituted or unsubstituted alkyl, R^1-substituted or unsubstituted cycloalkyl, R^1-substituted or unsubstituted heteroalkyl, R^1-substituted or unsubstituted heterocycloalkyl, R^1-substituted or unsubstituted aryl, R^1-substituted or unsubstituted heteroaryl, $-OR^2$, $-NR^4C(O)R^3$, $-NR^4R^5$, $-SR^6$, or $-PR^7R^8$,

wherein

R^1 is halogen, $-OR^9$, $-NR^{10}R^{11}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl;

R^2, R^3, R^4, R^5, R^6, R^7 and R^8 are independently hydrogen, R^{12}-substituted or unsubstituted alkyl, R^{12}-substituted or unsubstituted heteroalkyl, R^{12}-substituted or unsubstituted cycloalkyl, R^{12}-substituted or unsubstituted heterocycloalkyl, R^{12}-substituted or unsubstituted aryl or R^{12}-substituted or unsubstituted heteroaryl, wherein R^4 and R^5 are optionally joined together to form an R^{12}-substituted or unsubstituted heterocycloalkyl, or R^{12}-substituted or unsubstituted heteroaryl;

R^9, R^{10} and R^{11} are independently hydrogen, R^{12}-substituted or unsubstituted alkyl, R^{12}-substituted or unsubstituted heteroalkyl, R^{12}-substituted or unsubstituted cycloalkyl, R^{12}-substituted or unsubstituted heterocycloalkyl, R^{12}-substituted or unsubstituted aryl, or R^{12}-substituted or unsubstituted heteroaryl, wherein R^{10} and R^{11} are optionally joined together to form an

R^{12}-substituted or unsubstituted heterocycloalkyl, or R^{12}-substituted or unsubstituted heteroaryl;

R^{12} is halogen, $-OR^{13}$, $-NR^{14}R^{15}$, R^{16}-substituted or unsubstituted alkyl, R^{16}-substituted or unsubstituted heteroalkyl, R^{16}-substituted or unsubstituted cycloalkyl, R^{16}-substituted or unsubstituted heterocycloalkyl, R^{16}-substituted or unsubstituted aryl, or R^{16}-substituted or unsubstituted heteroaryl;

R^{13}, R^{14} and R^{15} are independently hydrogen or unsubstituted alkyl; and

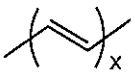
R^{16} is unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl.

3. The compound according to any of claims 1-2, wherein said pi-conjugation element has the formula:

$-L^1-(A^1)_q-L^2-(A^2)_r-L^3-$ or $-L^1-(A^1)_q-L^4-A^3-L^2-(A^2)_r-L^3-$,

wherein

q and r are independently 0 or 1;

L^1, L^2, L^3 and L^4 are independently a bond or a linking group having the formula: , wherein x is an integer from 1 to 50;

A^1, A^2 and A^3 are independently R^{17}-substituted or unsubstituted arylene, or R^{17}-substituted or unsubstituted heteroarylene;

R^{17} is halogen, $-OR^{18}$, $-NR^{19}R^{20}$, R^{21}-substituted or unsubstituted alkyl, R^{21}-substituted or unsubstituted heteroalkyl, R^{21}-substituted or unsubstituted cycloalkyl, R^{21}-substituted or unsubstituted heterocycloalkyl, R^{21}-substituted or unsubstituted aryl, or R^{21}-substituted or unsubstituted heteroaryl;

R^{18}, R^{19} and R^{20} are independently hydrogen, R^{21}-substituted or unsubstituted alkyl, R^{21}-substituted or unsubstituted heteroalkyl, R^{21}-substituted or unsubstituted cycloalkyl, R^{21}-substituted or unsubstituted heterocycloalkyl, R^{21}-substituted or unsubstituted aryl, or R^{21}-substituted or unsubstituted heteroaryl;

R^{21} is halogen, $-OR^{22}$, $-NR^{23}R^{24}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl; and

R^{22}, R^{23} and R^{24} are independently hydrogen or unsubstituted alkyl.

4. The compound according to claim 3, wherein A^1, A^2 and A^3 are independently R^{21}-substituted or unsubstituted naphthylene, or R^{21}-substituted or unsubstituted phenylene.

5. The compound according to claim 3, wherein x is an integer from 1 to 10.

6. The compound according to any of claims 1-5, wherein said water soluble group is R^{25}-substituted or unsubstituted alkyl, R^{25}-substituted or unsubstituted heteroalkyl, R^{25}-substituted or unsubstituted cycloalkyl, R^{25}-substituted or unsubstituted heterocycloalkyl, R^{25}-substituted or unsubstituted aryl, R^{25}-substituted or unsubstituted heteroaryl;

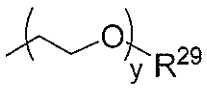
wherein

R^{25} is halogen, $-OR^{26}$, $-NR^{27}R^{28}$, R^{29}-substituted or unsubstituted alkyl, R^{29}-substituted or unsubstituted heteroalkyl, R^{29}-substituted or unsubstituted cycloalkyl, R^{29}-substituted or unsubstituted heterocycloalkyl, R^{29}-substituted or unsubstituted aryl, or R^{29}-substituted or unsubstituted heteroaryl;

R^{26}, R^{27} and R^{28} are independently hydrogen, R^{29}-substituted or unsubstituted alkyl, R^{29}-substituted or unsubstituted heteroalkyl, R^{29}-substituted or unsubstituted cycloalkyl, R^{29}-substituted or unsubstituted heterocycloalkyl, R^{29}-substituted or unsubstituted aryl, or R^{29}-substituted or unsubstituted heteroaryl, wherein R^{27} and R^{28} are optionally joined together to form an R^{29}-substituted or unsubstituted heterocycloalkyl, or R^{29}-substituted or unsubstituted heteroaryl;

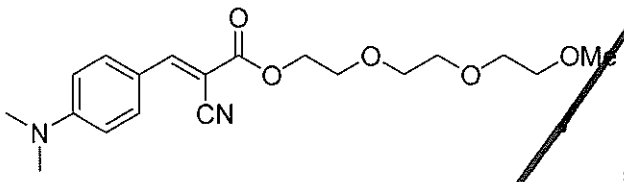
R^{29} is halogen, $-OR^{30}$, $-NR^{31}R^{32}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl; and

R^{30}, R^{31} and R^{32} are independently hydrogen or unsubstituted alkyl.

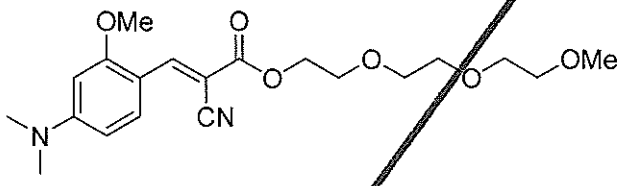
7. The compound according to claim 6, wherein said water soluble group is an ethylene glycol moiety having the formula: , wherein y is an integer from 1 to 50.

8. The compound according to claim 6, wherein R^{29} is -OH.

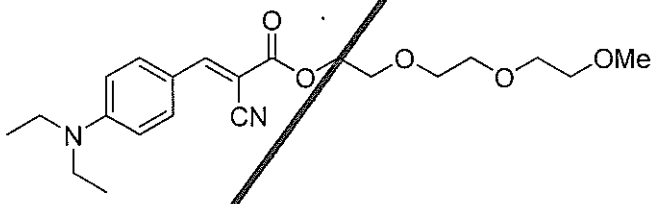
9. The compound according to any of claims 1-8, said compound having the structure:



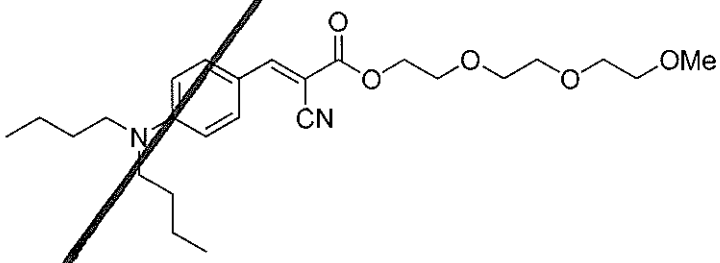
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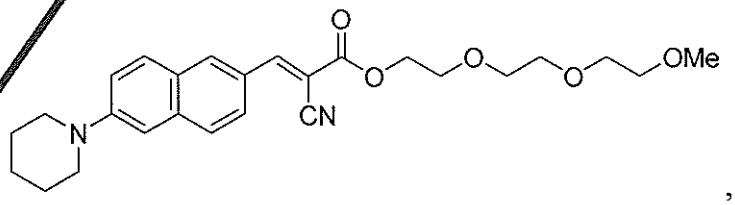
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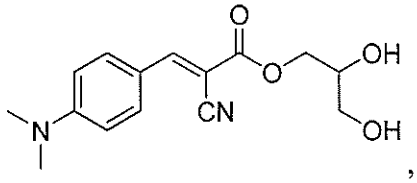
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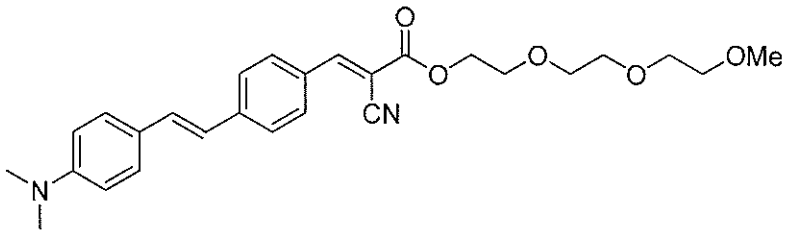
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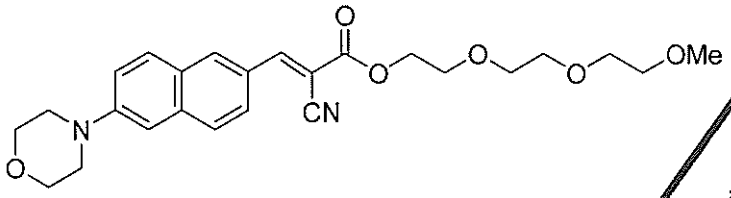


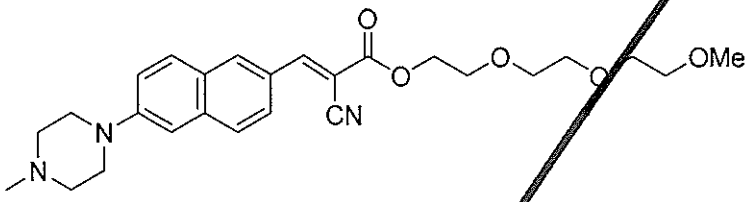
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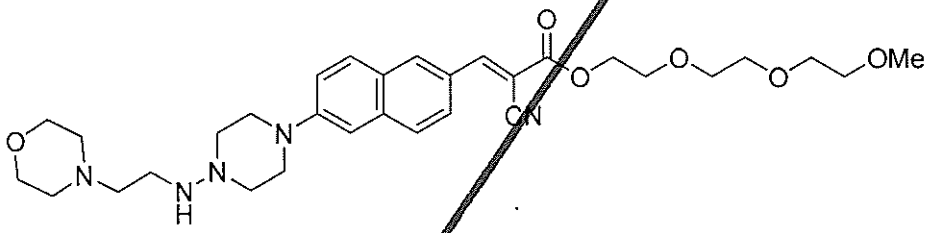


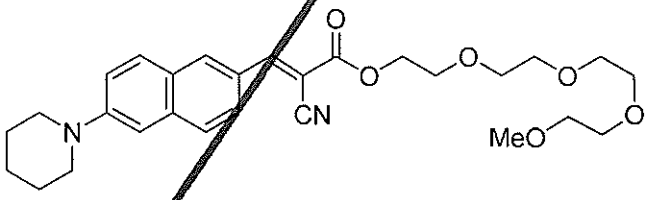
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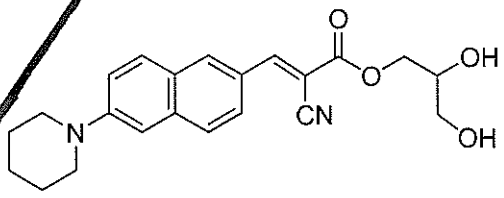
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1 10. A pharmaceutical composition comprising a compound according to
2 any of claims 1-9 and a pharmaceutically acceptable excipient.

1 11. A method of detecting an amyloid peptide, comprising contacting a
2 compound according to any one of claims 1-9 with an amyloid peptide thereby forming a
3 detectable amyloid complex, and detecting said detectable amyloid complex.

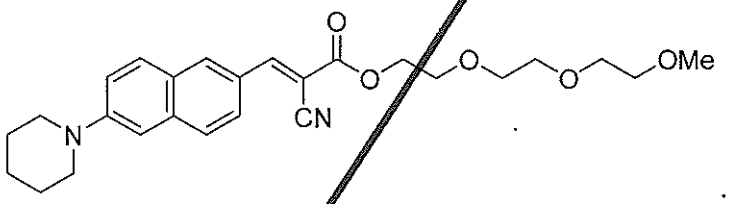
1 12. The method according to claim 11, wherein said amyloid peptide is Aβ
2 peptide, prion protein, α-synuclein, or superoxide dismutase.

13. The method according to claim 11, wherein said amyloid peptide forms part of an amyloid.

14. A method of treating a disease characterized by an accumulation of amyloids in a subject, comprising administering to a subject in need of treatment an effective amount of a compound or pharmaceutical composition according to any one of claims 1-10.

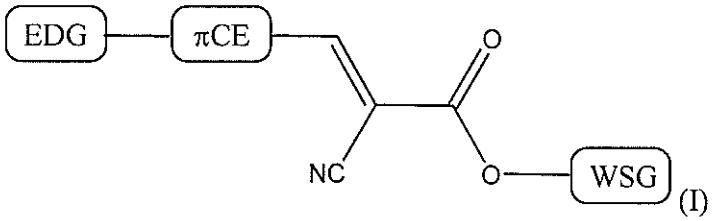
15. The method according to claim 14, wherein the disease is Alzheimer's disease, bovine spongiform encephalopathy (BSE), Parkinson's disease, Huntington's disease, Down's Syndrome, Dementia with Lewy Body, or Amyotrophic Lateral Sclerosis (ALS).

16. The compound according to claim 1, said compound having the structure:



CLAIMS

1. A compound having the structure of Formula (I),



(I)

wherein

EDG is an electron donor group;

πCE is a pi-conjugation element; and

WSG is a water soluble group;

wherein

said electron donor group is R^1-substituted or unsubstituted alkyl, R^1-substituted or unsubstituted cycloalkyl, R^1-substituted or unsubstituted heterocycloalkyl, R^1-substituted or unsubstituted aryl, R^1-substituted or unsubstituted heteroaryl, $-NR^4C(O)R^3$, $-NR^4R^5$, or $-PR^7R^8$,

wherein

R^1 is halogen, $-OR^9$, $-NR^{10}R^{11}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl;

R^4 is hydrogen, R^{12}-substituted alkyl, R^{12}-substituted or unsubstituted heteroalkyl, R^{12}-substituted or unsubstituted cycloalkyl, R^{12}-substituted or unsubstituted heterocycloalkyl, R^{12}-substituted or unsubstituted aryl or R^{12}-substituted or unsubstituted heteroaryl;

R^3, R^5, R^6, R^7 and R^8 are independently hydrogen, R^{12}-substituted or unsubstituted alkyl, R^{12}-substituted or unsubstituted heteroalkyl, R^{12}-substituted or unsubstituted cycloalkyl, R^{12}-substituted or unsubstituted heterocycloalkyl, R^{12}-substituted or unsubstituted aryl or R^{12}-substituted or unsubstituted heteroaryl, wherein

R^4 and R^5 are optionally joined together to form an R^{12}-substituted or unsubstituted heterocycloalkyl, or R^{12}-substituted or unsubstituted heteroaryl;

R^9, R^{10} and R^{11} are independently hydrogen, R^{12}-substituted or unsubstituted alkyl, R^{12}-substituted or unsubstituted heteroalkyl, R^{12}-substituted or unsubstituted cycloalkyl, R^{12}-substituted or unsubstituted heterocycloalkyl, R^{12}-substituted or unsubstituted aryl, or R^{12}-

substituted or unsubstituted heteroaryl, wherein R^{10} and R^{11} are optionally joined together to form an R^{12}-substituted or unsubstituted heterocycloalkyl, or R^{12}-substituted or unsubstituted heteroaryl;

R^{12} is halogen, $-OR^{13}$, $-NR^{14}R^{15}$, R^{16}-substituted or unsubstituted alkyl, R^{16}-substituted or unsubstituted heteroalkyl, R^{16}-substituted or unsubstituted cycloalkyl, R^{16}-substituted or unsubstituted heterocycloalkyl, R^{16}-substituted or unsubstituted aryl, or R^{16}-substituted or unsubstituted heteroaryl;

R^{13}, R^{14} and R^{15} are independently hydrogen or unsubstituted alkyl; and

R^{16} is unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl;

wherein

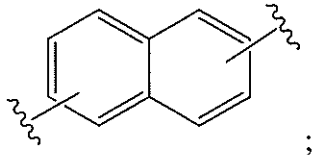
said pi-conjugation element has the formula:

$-L^1-(A^1)_q-L^2-(A^2)_r-L^3-$ or $-L^1-(A^1)_q-L^4-A^3-L^2-(A^2)_r-L^3-$,

wherein

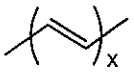
q and r are independently 0 or 1 and at least one of q or r is 1;

at least one of A^1 or A^2 is R^{17}-substituted or unsubstituted



;

L^1, L^2, L^3 and L^4 are independently a bond or a linking group having the formula:



, wherein x is an integer from 1 to 50;

A^1, A^2 and A^3 are independently R^{17}-substituted or unsubstituted arylene, or R^{17}-substituted or unsubstituted heteroarylene;

R^{17} is halogen, $-OR^{18}$, $-NR^{19}R^{20}$, R^{21}-substituted or unsubstituted alkyl, R^{21}-substituted or unsubstituted heteroalkyl, R^{21}-substituted or unsubstituted cycloalkyl, R^{21}-substituted or unsubstituted heterocycloalkyl, R^{21}-substituted or unsubstituted aryl, or R^{21}-substituted or unsubstituted heteroaryl;

R^{18}, R^{19} and R^{20} are independently hydrogen, R^{21}-substituted or unsubstituted alkyl, R^{21}-substituted or unsubstituted heteroalkyl, R^{21}-substituted or unsubstituted cycloalkyl,

R^{21}-substituted or unsubstituted heterocycloalkyl, R^{21}-substituted or unsubstituted aryl, or R^{21}-substituted or unsubstituted heteroaryl;

R^{21} is halogen, $-OR^{22}$, $-NR^{23}R^{24}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl; and

R^{22}, R^{23} and R^{24} are independently hydrogen or unsubstituted alkyl

2. The compound according to claim 1, wherein x is an integer from 1 to 10.

3. The compound of claim 1, wherein said water soluble group is R^{25}-substituted or unsubstituted alkyl, R^{25}-substituted or unsubstituted heteroalkyl, R^{25}-substituted or unsubstituted cycloalkyl, R^{25}-substituted or unsubstituted heterocycloalkyl, R^{25}-substituted or unsubstituted aryl, R^{25}-substituted or unsubstituted heteroaryl;

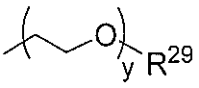
wherein

R^{25} is halogen, $-OR^{26}$, $-NR^{27}R^{28}$, R^{29}-substituted or unsubstituted alkyl, R^{29}-substituted or unsubstituted heteroalkyl, R^{29}-substituted or unsubstituted cycloalkyl, R^{29}-substituted or unsubstituted heterocycloalkyl, R^{29}-substituted or unsubstituted aryl, or R^{29}-substituted or unsubstituted heteroaryl;

R^{26}, R^{27} and R^{28} are independently hydrogen, R^{29}-substituted or unsubstituted alkyl, R^{29}-substituted or unsubstituted heteroalkyl, R^{29}-substituted or unsubstituted cycloalkyl, R^{29}-substituted or unsubstituted heterocycloalkyl, R^{29}-substituted or unsubstituted aryl, or R^{29}-substituted or unsubstituted heteroaryl, wherein R^{27} and R^{28} are optionally joined together to form an R^{29}-substituted or unsubstituted heterocycloalkyl, or R^{29}-substituted or unsubstituted heteroaryl;

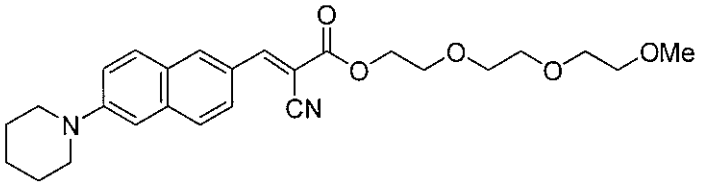
R^{29} is halogen, $-OR^{30}$, $-NR^{31}R^{32}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl; and

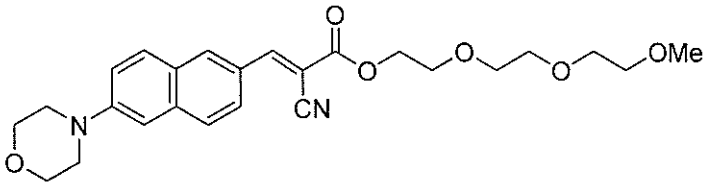
R^{30}, R^{31} and R^{32} are independently hydrogen or unsubstituted alkyl.

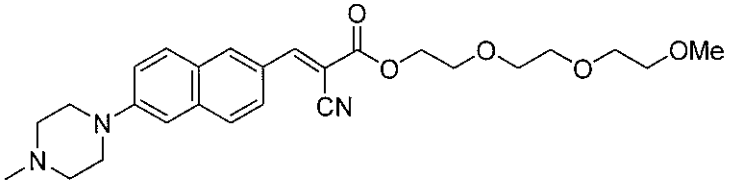
4. The compound according to claim 3, wherein said water soluble group is 
, wherein y is an integer from 1 to 50.

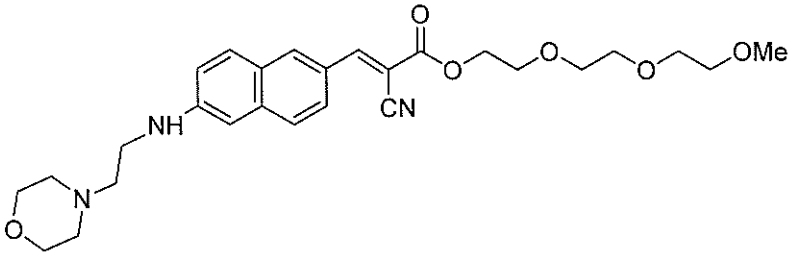
5. The compound according to claim 4, wherein R^{29} is unsubstituted alkyl.

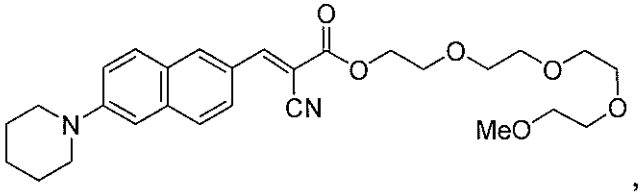
6. The compound according to any one of claims 1, 2 or 3, said compound having the structure:

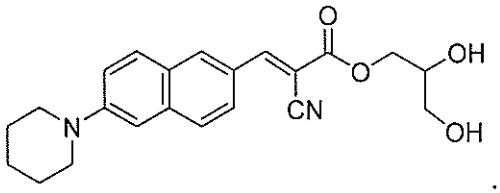

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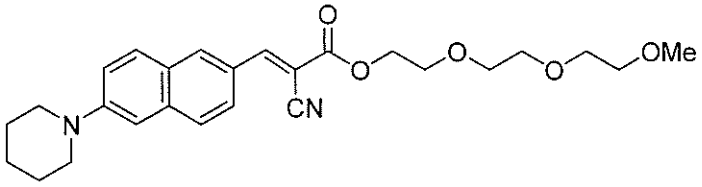

, or



7. The compound according to claim 1, wherein A^1, A^2 and A^3 are independently R^{17}-substituted or unsubstituted phenylene, or R^{17}-substituted or unsubstituted naphthylene.

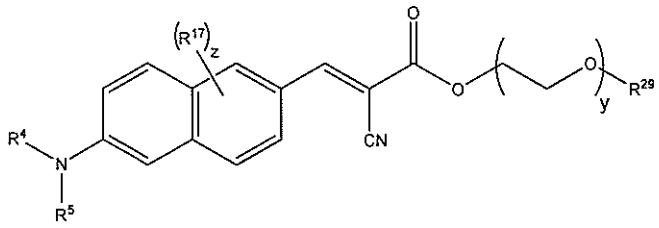
8. A pharmaceutical composition comprising a compound according to any one of claims 1, 2- 6, or 7 and a pharmaceutically acceptable excipient.

9. A compound represented by the following structural formula:



or a pharmaceutically acceptable salt thereof.

10. A compound represented by the following structural formula:



(IVb),

or a pharmaceutically acceptable salt thereof,

wherein:

R^4 and R^5 are independently hydrogen, R^{12}-substituted or unsubstituted alkyl, R^{12}-substituted or unsubstituted heteroalkyl, R^{12}-substituted or unsubstituted cycloalkyl, R^{12}-substituted or unsubstituted heterocycloalkyl, R^{12}-substituted or unsubstituted aryl or R^{12}-substituted or unsubstituted heteroaryl, wherein R^4 and R^5 are optionally joined together to form

an R^{12}-substituted or unsubstituted heterocycloalkyl, or R^{12}-substituted or unsubstituted heteroaryl;

R^{12} is halogen, $-OR^{13}$, $-NR^{14}R^{15}$, R^{16}-substituted or unsubstituted alkyl, R^{16}-substituted or unsubstituted heteroalkyl, R^{16}-substituted or unsubstituted cycloalkyl, R^{16}-substituted or unsubstituted heterocycloalkyl, R^{16}-substituted or unsubstituted aryl, or R^{16}-substituted or unsubstituted heteroaryl;

R^{13}, R^{14} and R^{15} are independently hydrogen or unsubstituted alkyl;

R^{16} is unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl;

R^{17} is halogen, $-OR^{18}$, $-NR^{19}R^{20}$, R^{21}-substituted or unsubstituted alkyl, R^{21}-substituted or unsubstituted heteroalkyl, R^{21}-substituted or unsubstituted cycloalkyl, R^{21}-substituted or unsubstituted heterocycloalkyl, R^{21}-substituted or unsubstituted aryl, or R^{21}-substituted or unsubstituted heteroaryl;

R^{18}, R^{19} and R^{20} are independently hydrogen, R^{21}-substituted or unsubstituted alkyl, R^{21}-substituted or unsubstituted heteroalkyl, R^{21}-substituted or unsubstituted cycloalkyl, R^{21}-substituted or unsubstituted heterocycloalkyl, R^{21}-substituted or unsubstituted aryl, or R^{21}-substituted or unsubstituted heteroaryl;

R^{21} is halogen, $-OR^{22}$, $-NR^{23}R^{24}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl;

R^{22}, R^{23} and R^{24} are independently hydrogen or unsubstituted alkyl;

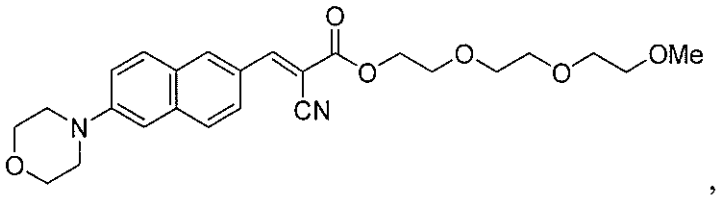
R^{29} is halogen, $-OR^{30}$, $-NR^{31}R^{32}$, unsubstituted alkyl, unsubstituted heteroalkyl, unsubstituted cycloalkyl, unsubstituted heterocycloalkyl, unsubstituted aryl, or unsubstituted heteroaryl;

R^{30}, R^{31} and R^{32} are independently hydrogen or unsubstituted alkyl;

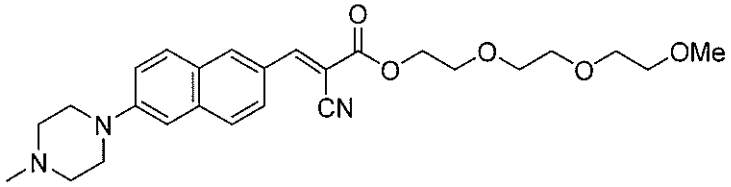
y is an integer from 1 to 10; and

z is an integer from 0 to 6.

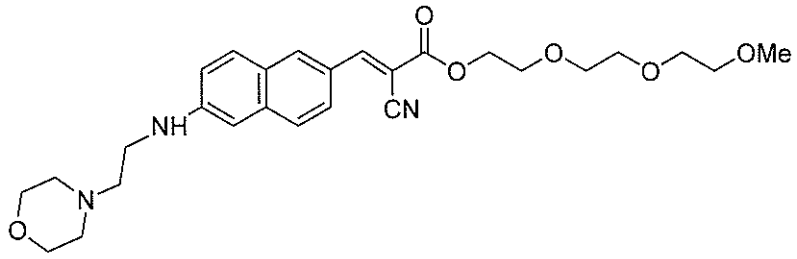
11. The compound according to claim 10, said compound having the structure:



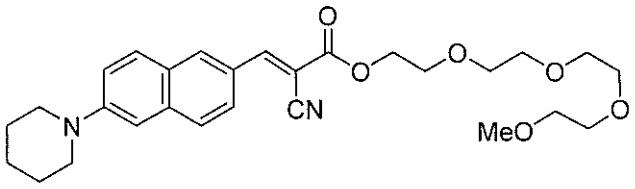
,



,



, or



,

or a pharmaceutically acceptable salt thereof.

12. The compound according to claim 10, wherein R^4 and R^5 are optionally joined together to form an R^{12}-substituted or unsubstituted heterocycloalkyl.

13. The compound according to claim 12, wherein said R^{12}-substituted or unsubstituted heterocycloalkyl is a substituted or unsubstituted piperidinyl.

14. The compound according to claim 13, wherein y is 2 and z is 0.

15. A pharmaceutical composition comprising a compound according to any one of claims 9-14 and a pharmaceutically acceptable excipient.