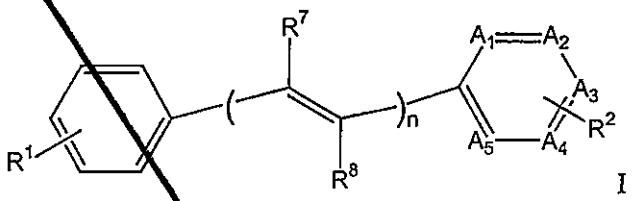
What is Claimed is:

1. A compound of Formula I



I

or a pharmaceutically acceptable salt thereof; wherein

n is an integer from one to six;

A4 is N;

one of A1, A2, A3, and A5 are independently -CH, or -CR^2, as permitted;

R^1 is:

-$(CH_2)pNR^aR^b$, wherein R^a and R^b are independently hydrogen, (C_{1-4}) alkyl, hydroxy(C_{1-4})alkyl or halo(C_{1-4})alkyl, and p is an integer from 0 to 5;

hydroxy,

(C_{1-4}) alkoxy,

hydroxy(C_{1-4})alkyl,

halogen,

cyano,

nitro,

(C_{1-4})alkyl,

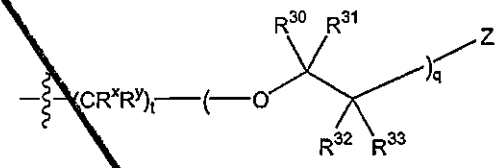
halo(C_{1-4})alkyl,

formyl,

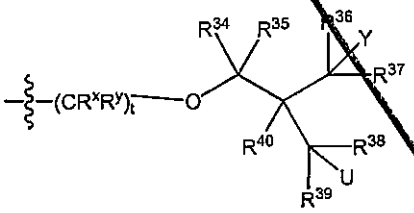
-NHCO(C_{1-4} alkyl), or

-OCO(C_{1-4} alkyl);

R^2 is:

i 

wherein, q is an integer from 1 to 10, Rx and Ry are hydrogen, hydroxy or C1-4 alkyl; t is 0, 1, 2 or 3; Z is hydroxy, halogen, benzoyloxy substituted with halogen, benzyloxy substituted with halogen, phenyl(C1-4)alkyl substituted with halogen, aryloxy substituted with halogen, or a C6-10 aryl substituted with halogen; and R30, R31, R32 and R33 are in each instance independently hydrogen, hydroxy, C1-4 alkoxy, C1-4 alkyl, or hydroxy(C1-4)alkyl;

ii 

wherein Rx and Ry are hydrogen, hydroxy or C_{1-4} alkyl; t is 0, 1, 2 or 3;

Y is halogen, benzoyloxy substituted with halogen, phenyl(C_{1-4})alkyl substituted with halogen, aryloxy substituted with halogen, or C_{6-10} aryl substituted with halogen;

U is hydrogen, hydroxy, halogen, benzoyloxy substituted with halogen, phenyl(C1-4)alkyl substituted with halogen, aryloxy substituted with halogen, or C_{6-10} aryl substituted with halogen; and

R^{34}, R^{35}, R^{36}, R^{37}, R^{38}, R^{39} and R^{40} are in each instance independently hydrogen, halogen, hydroxy, C_{1-4} alkoxy, C_{1-4} alkyl, or hydroxy(C_{1-4})alkyl;

iii. NR'R", wherein at least one of R' and R" is $(CH_2)_dX$, where X is halogen, and d is an integer from 1 to 4; the other of R' and R" is hydrogen, C_{1-4}alkyl, halo(C_{1-4})alkyl, or hydroxy(C_{1-4})alkyl;

iv. halo(C_{1-4})alkyl; or

v. an ether having the structure: [halo(C_{1-4})alkyl-O-(C_{1-4})alkyl]-;

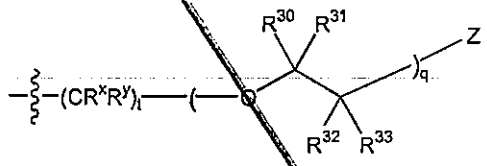
and

R^7 and R^8 are each hydrogen.

2. The compound of claim 1 wherein

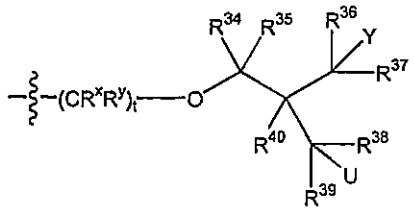
R^1 is hydroxy or $-(CH_2)_pNR^aR^b$, wherein p is an integer from 0 to 5, and Ra and Rb are independently hydrogen, C_{1-4} alkyl or $(CH_2)_dX$, where X is halogen, and d is an integer from 1 to 4,

R^2 is



i

wherein t is 0;



ii

wherein t is 0;

iii. NR'R";

iv. halo(C1-4)alkyl; or

v. an ether having the structure: [halo(C_{1-4})alkyl-O-(C_{1-4})alkyl]-.

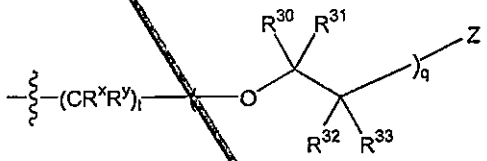
3. The compound of claim 1, wherein n is one.

4. The compound of claim 1, wherein at least one halogen is a radiohalogen.

5. The compound of claim 1, wherein at least one halogen is I, ^{123}I, ^{125}I, ^{131}I, Br, ^{76}Br, ^{77}Br, F or ^{18}F.

6. The compound of claim 5, wherein R^1 is $-(CH_2)_pNR^aR^b$, wherein R^a and R^b are independently hydrogen or C_{1-4}alkyl and p is 0.

7. The compound of claim 3, wherein R^2 is



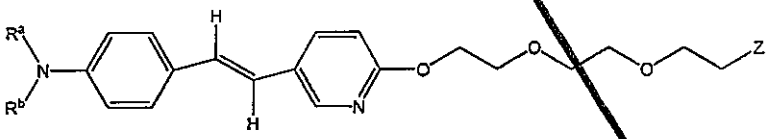
i

wherein t is 0.

8. The compound of claim 7, wherein q is an integer from 1 to 5.

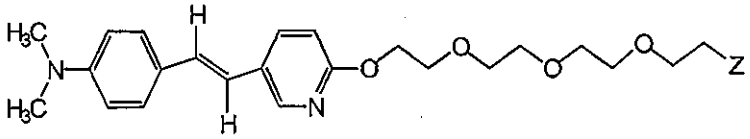
9. The compound of claim 8, wherein R^{30}, R^{31}, R^{32} and R^{33} are each hydrogen.

10. The compound of claim 9, having the formula:



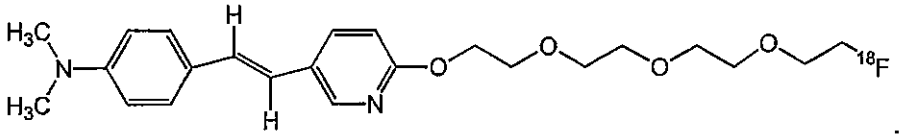
wherein, R^a and R^b are independently hydrogen or C_{1-4} alkyl and Z is I, ^{123}I, ^{125}I, ^{131}I, Br, ^{76}Br, ^{77}Br, F or ^{18}F.

11. The compound of claim 9, having the formula:

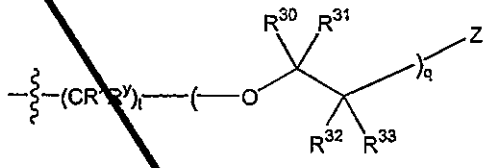


wherein Z is I, ^{123}I, ^{125}I, ^{131}I, Br, ^{76}Br, ^{77}Br, F or ^{18}F.

12. The compound of claim 9, having the formula:



13. The compound of claim 3, wherein R^2 is



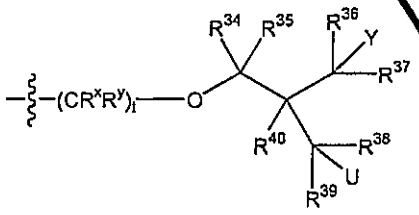
i

wherein t is 0 and Z is hydroxy.

14. The compound of claim 13, wherein q is an integer from 1 to 5.

15. The compound of claim 14, wherein R^{30}, R^{31}, R^{32} and R^{33} are each hydrogen, and q is 1, 2 or 3.

16. The compound of claim 1, wherein R^2 is

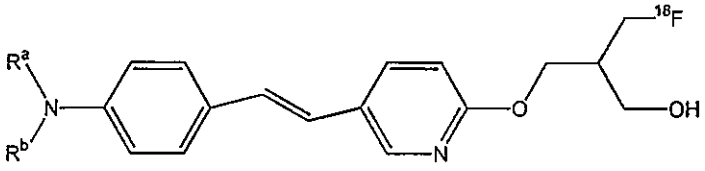


ii.

wherein t is 0 and U is hydroxy.

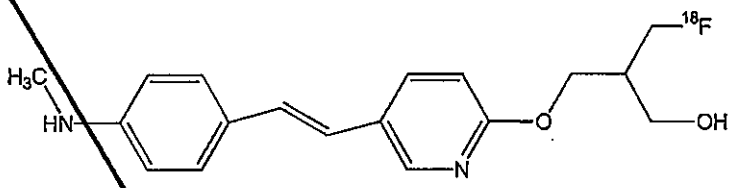
17. The compound of claim 16, wherein R^{34}, R^{35}, R^{36} and R^{37}, R^{38}, R^{39} and R^{40} are each hydrogen.

18. The compound of claim 16, having the formula:



wherein R^a and R^b are independently hydrogen or C_{1-4}alkyl.

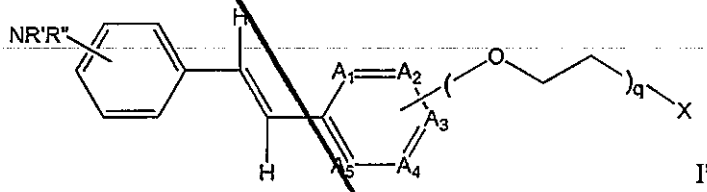
19. The compound of claim 16, having the structure:



Claims 35-45 (Canceled)

20. A composition comprising a compound according to claim 1 wherein said compound contains a ^{11}C isotope, said isotope present in an amount above natural abundance, and said compound containing said ^{11}C isotope having a specific activity above background level.

21. A compound of Formula Ia:



I'a

wherein one of A1, A2, A3, A4 and A5 is N, the others are –CH or C-$(O\text{-}CH_2CH_2)_qX$ as permitted; q is an integer from 1 to 10; R' and R" are each independently hydrogen or $C_{1\text{-}4}$ alkyl and X is a radiohalogen.

22. The compound of claim 21, wherein one of R' and R" is hydrogen, the other is $C_{1\text{-}4}$ alkyl.

23. A pharmaceutical composition comprising a compound of any one of claims 1, 3, or 21 and a pharmaceutically acceptable carrier or diluent.

24. A diagnostic composition for imaging amyloid deposits, comprising a radiolabeled compound of any one of claims 1, 3, or 21 and a pharmaceutically acceptable carrier or diluent.

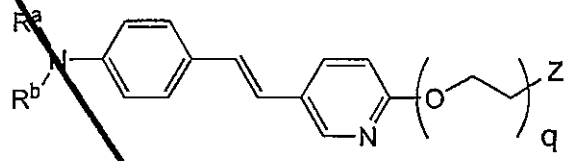
25. A method of imaging amyloid deposits in a mammal, comprising:

a. introducing into the mammal a detectable quantity of a diagnostic composition of claim 24;

b. allowing sufficient time for the labeled compound to be associated with amyloid deposits; and

c. detecting the labeled compound associated with one or more amyloid deposits.

26. A compound having the formula:

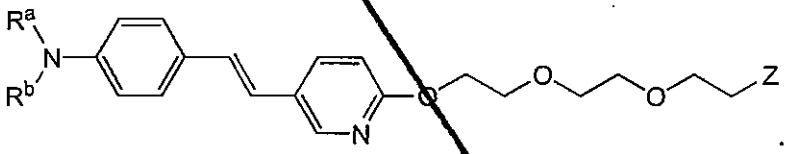


wherein, R^a and R^b are independently hydrogen or C_{1-4}alkyl; Z is I, ^{123}I, ^{125}I, ^{131}I, Br, ^{76}Br, ^{77}Br, F, ^{18}F, or -OTosyl; and q is an integer from 2 to 5.

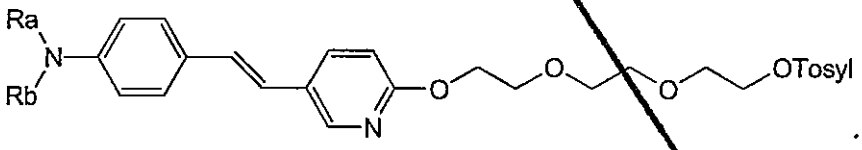
27. The compound of claim 26, wherein q is 3 or 4.

28. The compound of claim 26, wherein R^a is methyl and R^b is hydrogen.

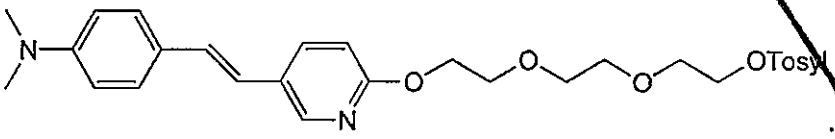
29. The compound of claim 26 having the formula:



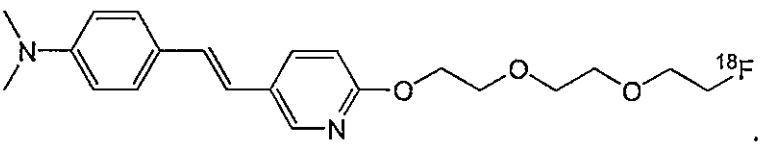
30. The compound of claim 29 having the formula:



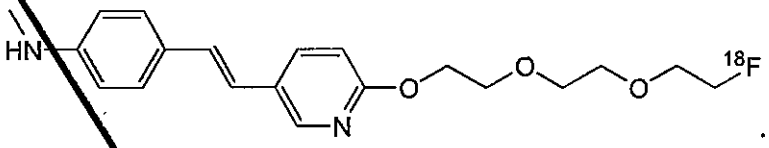
31. The compound of claim 30 having the formula:



32. The compound of claim 26 having the formula:



33. The compound of claim 26 having the formula:



34. The compound of claim 26, wherein R^a and R^b are independently hydrogen or methyl and q is an integer equal to 5.

35. A diagnostic composition for imaging amyloid deposits, comprising a radiolabeled compound of claim 26.

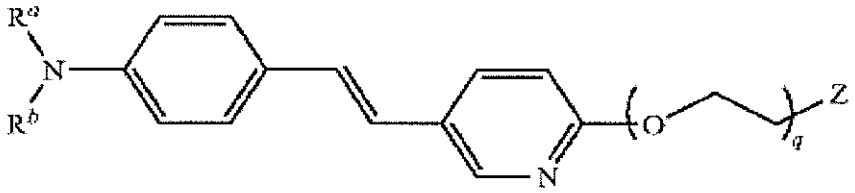
36. A method of imaging amyloid deposits in a mammal, comprising:
introducing into the mammal a detectable quantity of a diagnostic composition of claim 35;

allowing sufficient time for the labeled compound to be associated with amyloid deposits; and

detecting the labeling compound associated with one or more amyloid deposits.

What is claimed is:

1. A compound having the formula:

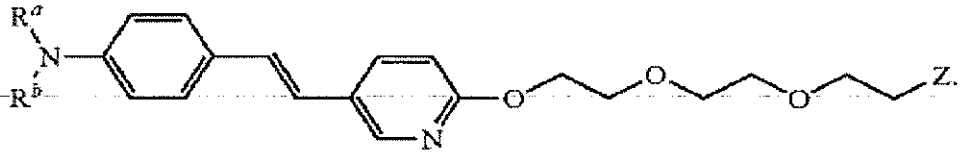


wherein, R^a and R^b are independently hydrogen or C_{1-4}alkyl; Z is I, ^{123}I, ^{125}I, ^{131}I, Br, ^{76}Br, ^{77}Br, F, ^{18}F, or —OTosyl; and q is an integer from 2 to 5.

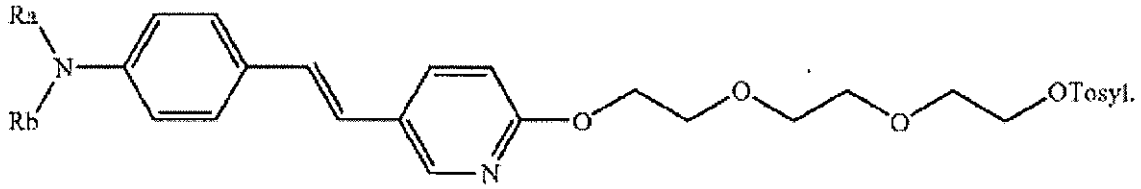
2. The compound of claim 1, wherein q is 3 or 4.

3. The compound of claim 1, wherein R^a is methyl and R^b is hydrogen.

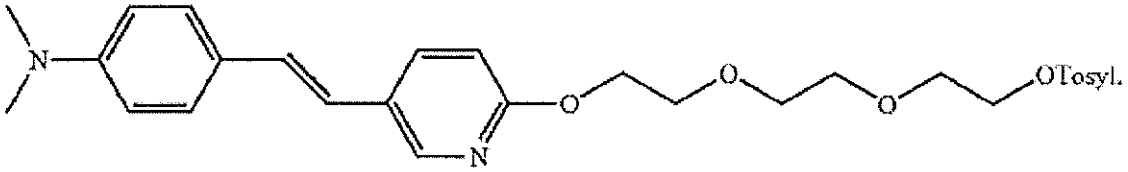
4. The compound of claim 1 having the formula:



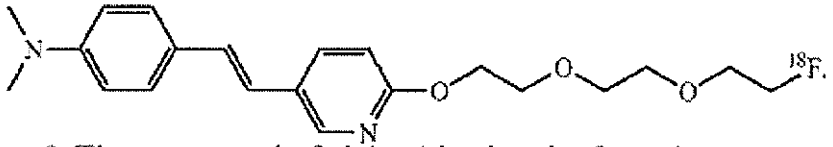
5. The compound of claim 4 having the formula:



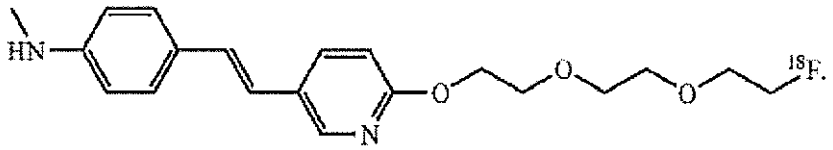
6. The compound of claim 5 having the formula:



7. The compound of claim 1 having the formula:



8. The compound of claim 1 having the formula:



9. The compound of claim 1, wherein R^a and R^b are independently hydrogen or methyl and q is an integer equal to 5.

10. A diagnostic composition for imaging amyloid deposits, comprising a radiolabeled compound of claim 1.

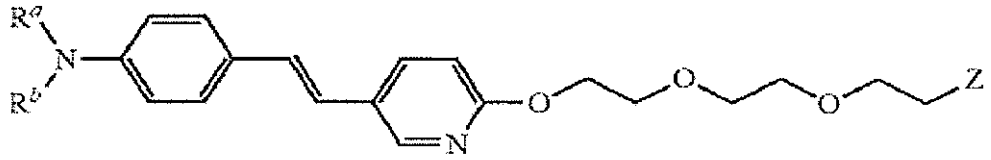
11. A method of imaging amyloid deposits in a mammal, comprising:

introducing into the mammal a detectable quantity of a diagnostic composition of claim 10;

allowing sufficient time for the labeled compound to be associated with amyloid deposits; and

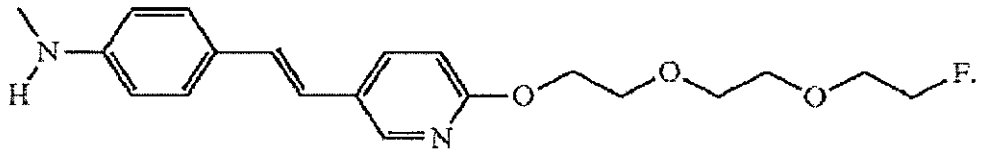
detecting the labeling compound associated with one or more amyloid deposits.

12. A compound of the formula:



wherein, R^a and R^b are independently hydrogen or methyl, and Z is —F or —^{18}F.

13. The compound of claim 12 of the formula:



14. A composition comprising a compound of claim 12 and a pharmaceutically acceptable carrier or diluent.

15. A composition comprising a compound of claim 13 and a pharmaceutically acceptable carrier or diluent.

16. A method of imaging amyloid deposits in a mammal, comprising:

introducing into the mammal a detectable quantity of a compound of claim 12;

allowing sufficient time for the compound to be associated with one or more amyloid deposits;

and detecting the compound associated with one or more amyloid deposits.

17. A method of imaging amyloid deposits in a mammal, comprising:

introducing into the mammal a detectable quantity of a composition of claim 14;

allowing sufficient time for the compound to be associated with one or more amyloid deposits;

and detecting the compound associated with one or more amyloid deposits.