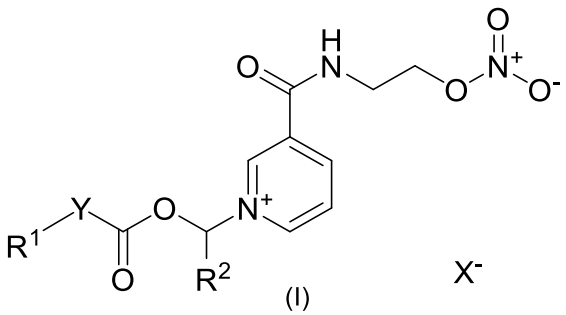
[0008] In some examples, the present disclosure provides use of a compound according to Formula (I) having the structure:



(I)

in a treatment of a disease or a condition related to kidney;

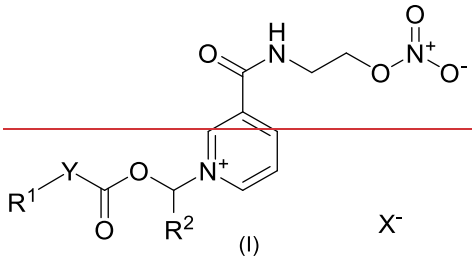
wherein X^- is a counter ion; Y is–$C(H)_2$-, -O-, or –$N(R^3)$-;

R^1 is substituted or unsubstituted C_1-C_4 alkyl, substituted or unsubstituted C_3-C_7-cycloalkyl, or substituted or unsubstituted 4-7 membered heterocycloalkyl;

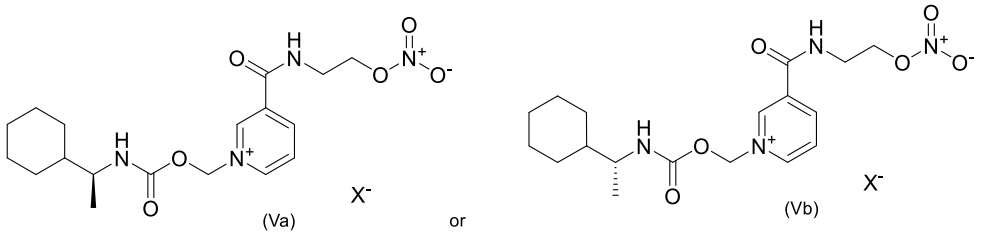
R^2 is H or C_1-C_4 alkyl; and

R^3 is H or substituted or unsubstituted C_1-C_4 alkyl; or R^1 and R^3 are joined together to form a 4-7 membered substituted or unsubstituted heterocycloalkyl.

[0008a] In one aspect, the present disclosure provides use of a compound according to formulae (Va) or (Vb)~~(I)~~:



(I)



(Va) or (Vb)

wherein X^- is a counter ion,

in the manufacture of a medicament for the treatment of a disease or a condition related to kidney.~~;~~

~~wherein X^- is a counter ion; Y is –$C(H)_2$-, -O-, or –$N(R^3)$-;~~

~~R^1 is substituted or unsubstituted C_1-C_4 alkyl, substituted or unsubstituted C_3-C_7-cycloalkyl, or substituted or unsubstituted 4-7 membered heterocycloalkyl;~~

~~R^2 is H or C_1-C_4 alkyl; and~~

~~R^3 is H or substituted or unsubstituted C_1-C_4 alkyl; or R^1 and R^3 are joined together to form a 4-7 membered substituted or unsubstituted heterocycloalkyl.~~

[0009] In some examples, Y is–$C(H)_2$-. In some examples, Y is -O-. In some examples, Y is–$N(R^3)$-. In particular examples, Y is–N(H)-.

[0010] In some examples, R^2 is H, Me, Et, or i-Pr. In a particular example, R^2 is H.

[0011] In some examples, R^1 is ethyl substituted with cyclohexyl.

[0012] In some examples, R^1 is 2-cyclohexyl-ethyl.

[0013] In some examples, the disease or condition is Chronic Kidney Disease, Diabetic Nephropathy, IgA Nephropathy, Acute Kidney Failure, Acute tubular necrosis, Transplant related Ischemia, Acute Kidney Disease and types of AKI such as Cisplatin induced AKI, Aminoglycosides induced AKI, Tenofovir induced AKI, Contrast Induced Nephropathy, AKI after surgery for partial nephrectomy, AKI post kidney transplant, AKI in patients with Dialysis, AKI after Cardiac surgery, AKI in patients inside ICU, AKI caused by Cirrhosis or Sepsis and AKI caused by hepatorenal syndrome.

[0014] In a particular example, the disease or condition is Contrast Induced Nephropathy.

[0015] In a particular example, the disease or condition is Tenofovir induced AKI.

[0016] In a particular example, the disease or condition is Aminoglycosides induced AKI.

[0017] In a particular example, the disease or condition is AKI after surgery.

[0018] In a particular example, the disease or condition is AKI in patients with Dialysis.

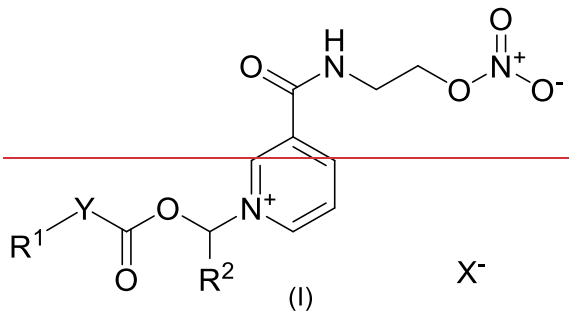
[0019] In a particular example, the disease or condition is Diabetic Nephropathy.

[0020] In a more particular example, the disease or condition is chronic kidney disease or CKD.

[0021] In some examples, the compound is:

WHAT IS CLAIMED IS:

1. Use of a compound according to formula (I):



(I)

in the manufacture of a medicament for the treatment of a disease or a condition related to kidney;

wherein X^- is a counter ion; Y is $-C(H)_2-$, $-O-$, or $-N(R^3)-$;

R^1 is substituted or unsubstituted C_1-C_4 alkyl, substituted or unsubstituted C_3-C_7 cycloalkyl, or substituted or unsubstituted 4-7 membered heterocycloalkyl;

R^2 is H or C_1-C_4 alkyl; and

R^3 is H or substituted or unsubstituted C_1-C_4 alkyl; or R^1 and R^3 are joined together to form a 4-7 membered substituted or unsubstituted heterocycloalkyl.

2. The use of claim 1, wherein R^2 is H, Me, Et, or i-Pr.

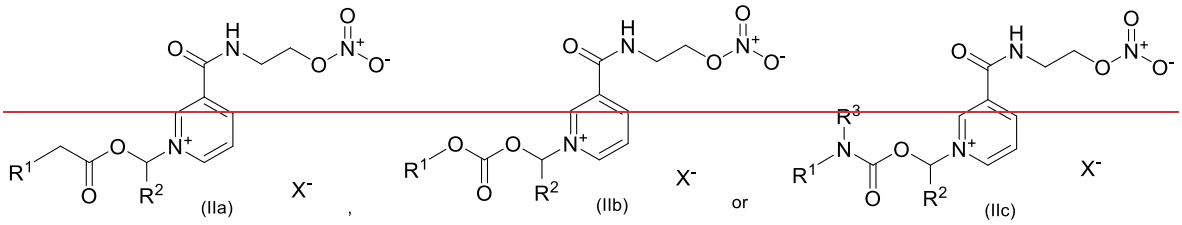
3. The use of claim 1, wherein R^2 is H.

4. The use according to any one of claims 1-3, wherein Y is $-C(H)_2-$.

5. The use according to any one of claims 1-3, wherein Y is -O-.

6. The use according to any one of claims 1-3, wherein Y is $-N(R^3)-$.

7. The use according to any one of claims 1-6, wherein the compound is according to formula (IIa), (IIb), or (IIc):



(IIa) , (IIb) or (IIc)

wherein

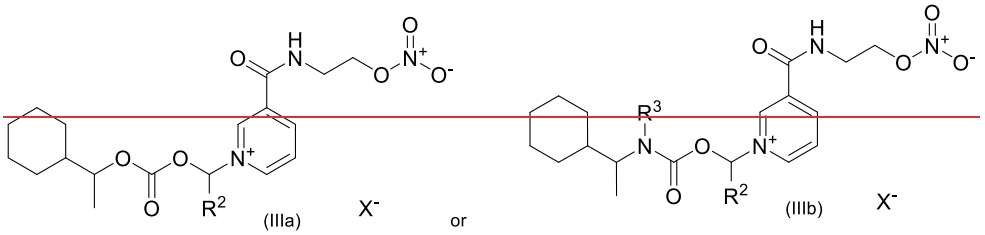
X^- is a counter ion; R^1 is substituted or unsubstituted C_1-C_4 alkyl, substituted or unsubstituted C_3-C_7 cycloalkyl, or substituted or unsubstituted 4-7 membered heterocycloalkyl;

R^2 is H or C_1-C_4 alkyl; and

R^3 is H or substituted or unsubstituted C_1-C_4 alkyl; or R^1 and R^3 are joined together to form a 4-7 membered substituted or unsubstituted heterocycloalkyl.

8. The use according to any one of claims 1-7, wherein R^1 is substituted or unsubstituted C_1-C_4 alkyl.

9. The use according to any one of claims 1-7, wherein R^1 is C_1-C_4 alkyl, unsubstituted or substituted with C_3-C_7 cycloalkyl.
10. The use according to any one of claims 1-7, wherein R^1 is Me, Et, i-Pr, n-Pr, n-Bu, i-Bu, sec-Bu, or t-Bu.
11. The use according to any one of claims 1-7, wherein R^1 is Me or Et substituted with cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl.
12. The use according to any one of claims 1-7, wherein R^1 is C_3-C_7 cycloalkyl unsubstituted or substituted with Me or Et.
13. The use according to any one of claims 1-7, wherein R^1 is cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl.
14. The use according to any one of claims 1-14, wherein R^3 is H or substituted or unsubstituted C_1-C_4 alkyl.
15. The use according to any one of claims 1-14, wherein R^3 is H.
16. The use according to any one of claims 1-14, wherein R^3 is Me, Et, i-Pr, n-Pr, n-Bu, i-Bu, sec-Bu, or t-Bu.
17. The use according to any one of claims 1-14, wherein R^1 and R^3 are joined together to form a 4-7 membered substituted or unsubstituted heterocycloalkyl.
18. The use according to any one of claims 1-14, wherein R^1 and R^3 are joined together to form pyrrolidinyl, piperidinyl, or morpholinyl.
19. The use according to any one of claims 1-18, wherein the compound is according to formula (IIIa), or (IIIb):

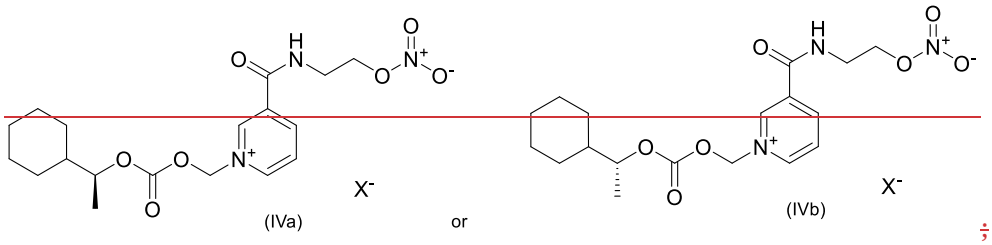


wherein

X^- is a counter ion; R^2 is H or C_1-C_4 alkyl; and

R^3 is H or substituted or unsubstituted C_1-C_4 alkyl.

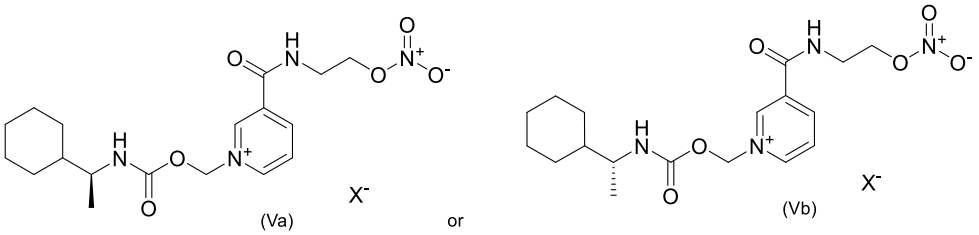
20. The use according to claim 19, wherein R^3 is H, Me, Et, or i-Pr.
21. The use according to claim 19, wherein R^3 is H.
22. The use according to any one of claims 1-21, wherein R^2 is H or Me.
23. The use according to any one of claims 1-21, wherein the compound is according to formula (IIIb); and each R^2 and R^3 is H.
24. The use according to any one of claims 1-21, wherein the compound is according to formula (IVa), or (IVb):



;

~~wherein X^- is a counter ion.~~

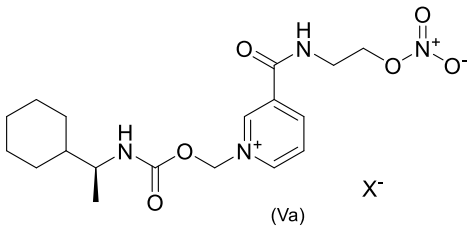
~~25.~~1. Use of a ~~The use according to any one of claims 1-21, wherein the~~ compound ~~is~~ according to formulae (Va), or (Vb):



wherein X^- is a counter ion,

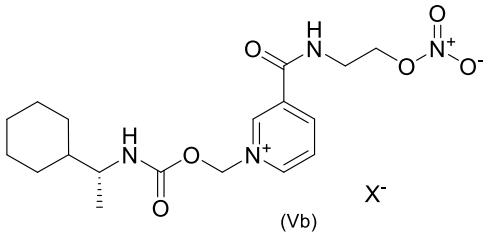
in the manufacture of a pharmaceutical composition for the treatment of a disease or a condition related to kidney.

2. The use according to claim 1, wherein the compound is according to formula (Va):



.

3. The use according to claim 1, wherein the compound is according to formula (Vb):



.

~~26.~~4. The use according to any one of claims 1-~~25~~3, wherein X^- is F^-, Cl^-, Br^-, I^-, or $MeSO_2O^-$.

~~27.~~5. The use according to any one of claims 1-~~25~~4, wherein X^- is Cl^-, or I^-.

6. The use according to any one of claims 1-5, wherein X^- is I^-.

~~28.~~7. The use according to any one of claims 1-~~27~~6, wherein the pharmaceutical composition comprises a pharmaceutically acceptable excipient.

29.8. The use of according to claim 287, wherein the pharmaceutical compostion is formulated for a route of administration selected from oral administration, parenteral administration, buccal administration, nasal administration, topical administration, or rectal administration.

9. The use according to claim 8, wherein the parenteral administration is selected from intravenous, subcutaneous, or intramuscular.

30.10. The use according to any one of claims 1-299, wherein the disease or condition is Chronic Kidney Disease, Diabetic Nephropathy, IgA Nephropathy, Acute Kidney Failure, Acute tubular necrosis, Transplant related Ischemia, Acute Kidney Disease and types of AKI such as Cisplatin induced AKI, Aminoglycosides induced AKI, Tenofovir induced AKI, Contrast Induced Nephropathy, AKI after surgery for partial nephrectomy, AKI post kidney transplant, AKI in patients with Dialysis, AKI after Cardiac surgery, AKI in patients inside ICU, AKI caused by Cirrhosis or Sepsis and AKI caused by hepatorenal syndrome.

31.11. The use according to any one of claims 1-2910, wherein the disease or condition is Chronic Kidney Disease.

32.12. The use according to any one of claims 1-2910, wherein the disease or condition is Acute Kidney Failure.

33.13. The use of any of claims 1-8 or 10-3212, wherein the compound of formula (Va) or formula (Vb) (I) is to be administered orally.