CLAIMS

What is claimed is:

1. ~~A method for treating or preventing one or more symptoms of a kidney injury, disease, and/or disorder in a subject in need thereof, the method comprising: administering to the subject~~Use of a formulation comprising dendrimers complexed to, covalently conjugated to, or having intra-molecularly dispersed or encapsulated therein, one or more therapeutic or prophylactic agents in the manufacture of a medicament for treating or preventing one or more symptoms of a kidney injury, disease, and/or disorder in a subject in need thereof,

wherein the dendrimer-agent formulation is to be administered in an amount effective to treat, alleviate or prevent one or more symptoms of the kidney injury, disease, and/or disorder.

2. The ~~method~~use of claim 1, wherein the kidney injury, disease and/or disorder is an acute or chronic kidney disease.

3. The ~~method~~use of claim 1 or 2, wherein the kidney injury, disease and/or disorder is caused by ischemia/reperfusion injury.

4. The ~~method~~use of claim 3, wherein the kidney injury, disease and/or disorder is caused by a condition selected from the group consisting of infection, sepsis, ischemia-reperfusion injury, diabetic complications, hypertension, obesity, autoimmunity diabetes, high blood pressure, heart failure, kidney disease, liver disease, and cancer.

5. The ~~method~~use of any one of claims 1-4, wherein the dendrimers are hydroxyl-terminated dendrimers.

6. The ~~method~~use of any one of claims 1-5, wherein the dendrimers are generation 4, generation 5, or generation 6 poly(amidoamine) dendrimers.

7. The ~~method~~use of any one of claims 1-6, wherein the therapeutic agent is an anti-inflammatory agent.

8. The ~~method~~use of any one of claims 1-6, wherein the therapeutic agent is a PPAR-δ agonist.

9. The ~~method~~use of claim 8, wherein the PPAR-δ agonist is GW0742, GW0742-amide derivative and GW0742-ester derivative, GW0742-amide derivative, or GW0742-ester derivative.

10. The ~~method~~use of claim 7, wherein the anti-inflammatory agent is selected from the group consisting of N-acetylcysteine, steroidal anti-inflammatory drugs, non-steroidal drugs, cyclosporine, tacrolimus, rapamycin, SGLT2 inhibitors, LPA1 receptor antagonists, vasopression V2-receptor antagonists, endothelian receptor antagonists, and uric acid transporter inhibitors.

11. The ~~method~~use of any one of claims 1-10, wherein the formulation is to be administered in an amount effective to reduce inflammation in the kidney.

12. The ~~method~~use of any one of claims 1-10, wherein the formulation is to be administered in an amount effective to reduce tubular damage, tubular epithelial flattening, tubular dilatation, and tubular epithelial cell necrosis, and/or apoptosis in the kidneys.

13. The ~~method~~use of any one of claims 1-10, wherein the formulation is to be administered in an amount effective to reduce serum levels of creatinine and/or blood urea nitrogen (BUN); to reduce urine NGAL and/or KIM-1 content; and/or to improve glomerular filtration rate (GFR).

14. The ~~method~~use of any one of claims 1-10, wherein the formulation is to be administered in an amount effective to reduce the amount or presence of one or more pro-inflammatory cells, chemokines, and/or cytokines in the kidney.

15. The ~~method~~use of claim 14, wherein the formulation is to be administered in an amount effective to reduce one or more pro-inflammatory cytokines selected from the group consisting of TNF-α, IFN-γ, IL-6, IL-1β, IL-23, and IL-17.

16. The ~~method~~use of any one of claims 1-15, wherein the formulation comprises a therapeutic, prophylactic or diagnostic agent selected from the group consisting of chemotherapeutic agents, anti-angiogenic agents, anti-excitotoxic agents, inhibitors of glutamate formation/release, anti-VEGF agents including aflibercept, immunomodulators such as rapamycin, uric acid transporter (URAT1) inhibitors, vasopression V2-receptor antagonists, endothelin receptor antagonists, subtype 2 sodium-glucose transport protein (SGLT2) inhibitor, and LPA1 receptor antagonists.

17. The ~~method~~use of any one of claims 1-16, wherein the formulation is formulated for intravenous, subcutaneous, or intramuscular administration.

18. The ~~method~~use of any one of claims 1-16 wherein the formulation is formulated for enteral administration.

19. The ~~method~~use of any one of claims 1-16, wherein the formulation is to be administered via the intravenous, subcutaneous, or intramuscular route.

20. The ~~method~~use of any one of claims 1-19, wherein the formulation is to be administered prior to, in conjunction, subsequent to, or in alternation with treatment with one or more additional therapies or procedures.

21. The ~~method~~use of claim 20, wherein the one or more additional procedures include ~~administering~~administration of intravenous fluids and/or hemodialysis.

~~22. A pharmaceutical formulation for use in the method of any one of claims 1-21.~~

~~23~~22. A kit comprising

(1) one or more single unit dose of a composition comprising dendrimers covalently conjugated with one or more PPAR-δ agonists, and

(2) instructions on how the dose is to be administered for treatment of one or more kidney injuries, diseases, and/or conditions.

~~24~~23. A composition comprising a compound that comprises a dendrimer conjugated to a PPAR-δ agonist through an ester, ether, or amide linkage, wherein the dendrimer comprises a high density of surface hydroxyl groups.

~~25~~24. The composition of claim ~~24~~23, wherein the PPAR-δ agonist is conjugated to the ester, ether, or amide linkage through a spacer.

~~26~~25. The composition of claim ~~25~~24, wherein the spacer comprises alkyl groups, heteroalkyl groups, or alkylaryl groups.

~~27~~26. The composition of claim ~~25~~24 or ~~26~~25, wherein the spacer comprises a peptide.

~~28~~27. The composition of any one of claims ~~25-27~~24-26, wherein the spacer comprises polyethylene glycol.

~~29~~28. The composition of any one of claims ~~24-28~~23-27, wherein conjugation of the PPAR-δ agonist occurs on less than 50% of total available surface functional groups of the dendrimer prior to the conjugation.

~~30~~29. The composition of any one of claims ~~24-29~~23-28, wherein conjugation of the PPAR-δ agonist occurs on less than occurs on less than 5%, less than 10%, less than 20%, less than 30%, or less than 40% of total available surface functional groups of the dendrimer prior to the conjugation.

~~31~~30. The composition of any one of claims ~~24-30~~23-29, wherein the PPAR-δ agonist is an indanylacetic acid derivative.

~~32~~31. The composition of any one of claims ~~24-31~~23-30, wherein the PPAR-δ agonist is GW0742.

~~33~~32. The composition of any one of claims ~~24-32~~23-31, wherein the PPAR-δ agonist is a GW0742-amide derivative or a GW0742-ester derivative.

~~34~~33. The composition of any one of claims ~~24-33~~23-32, wherein the dendrimer comprises poly(amidoamine), polypropylamine (POPAM), polyethylenimine, polylysine, polyester, iptycene, aliphatic poly(ether), and/or aromatic polyether.

~~35~~34. The composition of any one of claims ~~24-34~~23-33, wherein the dendrimer is a poly(amidoamine) dendrimer.

~~36~~35. The composition of any one of claims ~~24-35~~23-34, wherein the dendrimer is a generation 4, generation 5, or generation 6 poly(amidoamine) dendrimer.

~~37~~36. The composition of any one of claims ~~24-36~~23-35, wherein the zeta potential of the compound is between -25 mV and 25 mV.

~~38~~37. The composition of any one of claims ~~24-37~~23-36, wherein the zeta potential of the compound is between -20 mV and 20 mV, between -10 mV and 10 mV, between -10 mV and 5 mV, between -5 mV and 5 mV, or between -2 mV and 2 mV.

~~39~~38. The composition of any one of claims ~~24-38~~23-37, wherein the surface charge of the compound is neutral or near-neutral.

~~40~~39. The composition of any one of claims ~~24-39~~23-38, wherein the dendrimer conjugated to the PPAR-δ agonist through an ether or amide linkage.

~~41~~40. The composition of any one of claims ~~24-40~~23-39, wherein the dendrimer conjugated to the PPAR-δ agonist through an ether linkage.

41. The composition of any one of claims 23-40 for use as a medicament.