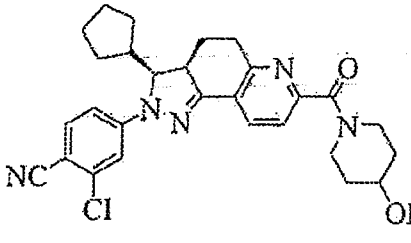
We Claim:

1. Crystal form of a compound represented by formula (1), 2-chloro-4-[(3S,3aR)-3-cyclopentyl-7-(4-hydroxypiperidin-1-carbonyl)-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinolin-2-yl]benzonitrile,



Formula (1)

having an X-ray powder diffraction pattern comprising the following characteristic peaks expressed by 2θ degree, when measured using CuKa radiation:
Crystal Form I: 14.8°±0.2°, 17.4°±0.2°, 19.4°±0.2°, 19.8°±0.2°;
Crystal Form II: 14.6°±0.2°, 19.9°±0.2°, 21.2°±0.2°, 24.6°±0.2°.

2. The crystal form of the compound according to claim 1, having an X-ray powder diffraction pattern comprising the following characteristic peaks expressed by 2θ degree, when measured using CuKa radiation:
Crystal Form I: 14.8°±0.2°, 16.9°±0.2°, 17.4°±0.2°, 19.4°±0.2°, 19.8°±0.2°, 26.2°±0.2°;
Crystal Form II: 14.6°±0.2°, 18.0°±0.2°, 18.7°±0.2°, 19.9°±0.2°, 21.2°±0.2°, 24.6°±0.2°.

3. The crystal form of the compound according to claim 1 or claim 2, having an X-ray powder diffraction pattern comprising the following characteristic peaks expressed by 2θ degree, when measured using CuKa radiation:
Crystal Form I: 9.8°±0.2°, 12.9°±0.2°, 14.8°±0.2°, 15.4°±0.2°, 16.9°±0.2°, 17.4°±0.2°, 19.4°±0.2°, 19.8°±0.2°, 22.6°±0.2°, 26.2°±0.2°;
Crystal Form II: 4.5°±0.2°, 9.0°±0.2°, 12.2°±0.2°, 14.0°±0.2°, 14.6°±0.2°, 18.0°±0.2°, 18.7°±0.2°, 19.9°±0.2°, 21.2°±0.2°, 24.6°±0.2°.

4. A process for preparing the crystal form of the compound according to any one of claims 1-3, comprising one of the following steps:
placing the compound represented by formula (1) in an anhydrous lower alcohol, acetonitrile, a mixed solvent of ethyl acetate and ethanol, a mixed solvent of methanol and tetrahydrofuran, or

a mixed solvent of acetonitrile and acetone, heating the resulting solution until it becomes clear, then cooling the resulting solution to separate out a solid, and filtering and drying the separated solid; or

placing the compound represented by formula (I) in a lower alcohol to dissolve it, then adding the resulting solution dropwisely to water, filtering the resulting mixture, and drying the filtered substance under vacuum; or

washing the compound represented by formula (I) with a mixed solution of water and acetonitrile, filtering the resulting mixture, and drying the filtered substance under vacuum; or dissolving the compound represented by formula (I) in acetone, adding the resulting solution dropwisely to n-heptane, and filtering the resulting mixture.

5. The process according to claim 4, wherein the compound represented by formula (I) is prepared by a process comprising the steps of:

(9) Chirally resolving ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate to produce (3S,3aR)-ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate;

(10) Hydrolyzing (3S,3aR)-ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate to produce (3S,3aR)-2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylic acid;

(11) Subjecting (3S,3aR)-2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylic acid and 4-hydroxypiperidine to a condensation reaction to produce the compound represented by formula (I).

6. The process according to claim 4, wherein the compound represented by formula (I) is prepared by a process comprising the steps of:

(1) Subjecting 1,3-cyclohexanedione, ammonium acetate and acrolein to condensation and addition reactions to produce 5-oxo-5,6,7,8-tetrahydroquinoline;

(2) Subjecting 5-oxo-5,6,7,8-tetrahydroquinoline to an oxidation reaction to produce

5-oxo-5,6,7,8-tetrahydroquinoline-N-oxide;

(3) Subjecting 5-oxo-5,6,7,8-tetrahydroquinoline-N-oxide, N,N-dimethylcarbamic chloride, and trimethylsilylcyanide to a substitution reaction to produce 5-oxo-5,6,7,8-tetrahydroquinoline-2-carbonitrile;

(4) Subjecting 5-oxo-5,6,7,8-tetrahydroquinoline-2-carbonitrile to hydrolysis and esterification reactions to produce ethyl 5-oxo-5,6,7,8-tetrahydroquinoline-2-carboxylate;

(5) Subjecting ethyl 5-oxo-5,6,7,8-tetrahydroquinoline-2-carboxylate and cyclopentanecarbaldehyde to a condensation reaction to produce (E)-ethyl 6-cyclopentylmethylene-5-oxo-5,6,7,8-tetrahydroquinoline-2-carboxylate;

(6) Subjecting 2-chloro-4-fluorobenzonitrile and hydrazine hydrate to a substitution reaction to produce 2-chloro-4-hydrazinobenzonitrile;

(7) Subjecting 2-chloro-4-hydrazinobenzonitrile and hydrochloric acid to a salt forming reaction to produce 2-chloro-4-hydrazinobenzonitrile hydrochloride;

(8) Subjecting (E)-ethyl 6-cyclopentylmethylene-5-oxo-5,6,7,8-tetrahydroquinoline-2-carboxylate and 2-chloro-4-hydrazinobenzonitrile hydrochloride to a condensation reaction to produce ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate;

(9) Chirally resolving ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate to produce (3S,3aR)-ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate;

(10) Hydrolyzing (3S,3aR)-ethyl 2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylate to produce (3S,3aR)-2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylic acid;

(11) Subjecting (3S,3aR)-2-(3-chloro-4-cyanophenyl)-3-cyclopentyl-3,3a,4,5-tetrahydro-2H-pyrazolo[3,4-f]quinoline-7-carboxylic acid and 4-hydroxypiperidine to a condensation reaction to produce the compound represented by formula (1).

7. A pharmaceutical composition containing the crystal form of the compound represented by formula (1) according to any one of claims 1-3, and a pharmaceutically acceptable carrier, wherein said crystal form comprises Crystal Forms I, II or a combination thereof.

8. Use of the crystal form of the compound represented by formula (1) according to any one of claims 1-3 in manufacture of a medicament for treating and/or preventing kidney injury or cardiovascular disease, wherein said crystal form comprises Crystal Forms I, II or a combination thereof.

9. The use according to claim 8, wherein said cardiovascular disease comprises heart injury, hypertension, heart failure, myocardial infarction, angina pectoris, cardiac hypertrophy, myocarditis, fibrosis of heart and blood vessel, baroceptor dysfunction or arrhythmia.

10. The crystal form of the compound represented by formula (1) according to any one of claims 1-3 for use in treating and/or preventing kidney injury or cardiovascular disease, wherein said crystal form comprises Crystal Forms I, II or a combination thereof.

11. The crystal form of claim 10, wherein said cardiovascular disease comprises heart injury, hypertension, heart failure, myocardial infarction, angina pectoris, cardiac hypertrophy, myocarditis, fibrosis of heart and blood vessel, baroceptor dysfunction or arrhythmia.