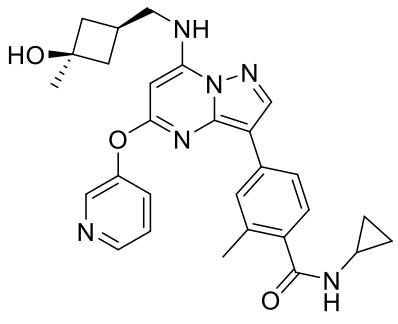
CLAIMS

What is claimed is:

1. A co-crystal of compound (I) and a co-former molecule,



(I),

or a solvate of the co-crystal, wherein the co-former molecule is phosphoric acid.

2. The co-crystal of claim 1, wherein the molar ratio of compound (I) : phosphoric acid in the co-crystal is 1:2.

3. The co-crystal of claim 1 or 2, wherein the co-crystal is a hydrate.

4. The co-crystal of any one of claims 1-3, wherein the molar ratio of compound (I) : phosphoric acid : H_2O in the co-crystal is 1:2:1/2.

5. The co-crystal of any one of claims 1-4, wherein the co-crystal is characterized by any three, four or five of X-ray powder diffraction pattern peaks at 7.6°, 12.0°, 20.3°, 23.5°, and 24.5° ± 0.2 in 2θ.

6. The co-crystal of any one of claims 1-4, wherein the co-crystal is characterized by any three, four, five, six, seven, eight, nine, ten, or eleven of X-ray powder diffraction pattern peaks at 7.6°, 11.1°, 12.0°, 15.4°, 17.5°, 19.8°, 20.0°, 20.3°, 21.2°, 23.5°, 23.6°, and 24.5° ± 0.2 in 2θ.

7. The co-crystal of any one of claims 1-4, wherein the co-crystal is characterized by X-ray powder diffraction pattern peaks at 7.6°, 11.1°, 12.0°, 15.4°, 17.5°, 19.8°, 20.0°, 20.3°, 21.2°, 23.5°, 23.6°, and 24.5° ± 0.2 in 2θ.

8. The co-crystal of any one of claims 1-7, wherein the co-crystal is characterized by differential scanning calorimeter (DSC) peak phase transition temperatures of 160 ± 4 °C.

9. The co-crystal of any one of claims 1-8, wherein a hydrogen bonding is formed between the hydrogen of the phosphoric acid and the nitrogen atom of the pyridine ring of compound (I) and the hydrogen bonding has a distance between 2.5-2.9 Å.

10. The co-crystal of any one of claims 1-9, wherein the co-crystal is characterized by an ^{15}N- Solid State Nuclear Magnetic Resonance Spectroscopy (^{15}N-ssNMR) peak at -122.5 ± 2 ppm, and the intensity of the peak at -122.5 ppm is at least 40-70% less than the peak at -302 ppm.

11. A pharmaceutical composition comprising the co-crystal of any one of claims 1-10, and a pharmaceutically acceptable carrier or diluent.

12. A method of preparing a co-crystal of the compound (I) and phosphoric acid as defined in claim 1, the method comprising:

mixing a suspension of phosphoric acid and compound (I) in a suitable solvent; and

removing the solvent.

13. The method of claim 12, wherein the molar ratio between compound (I) and phosphoric acid is 1:2 to 1:8.

14. The method of claim 12 or 13, wherein the solvent is acetone, diethyl ether, MeOH/THF, acetic acid or 1,4-dioxane.

15. The method of claim 12, wherein the solvent is THF/MeOH; and the ratio between the two solvents is 3:2 to 2:3 (V:V).

16. Use of a co-crystal of any one of claims 1-10 or a pharmaceutical composition thereof in the manufacture of a medicament for treating a subject with cancer, wherein the cancer is pancreatic cancer, prostate cancer, lung cancer, melanoma, breast cancer, colon cancer, or ovarian cancer.

17. The use of claim 16, wherein the cancer is lung cancer, breast cancer or colon cancer.

18. The use of claim 17, wherein the cancer is breast cancer.