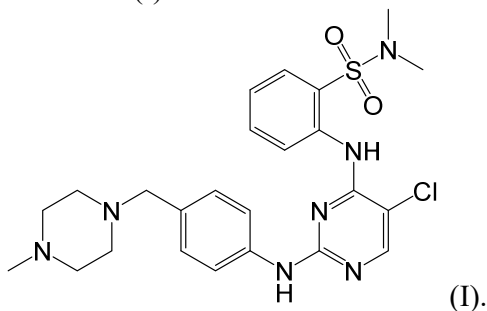


SUMMARY

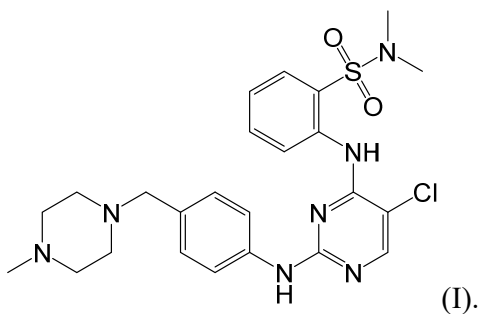
In one aspect of the present disclosure, there is provided a crystalline form of a tartrate salt of the compound of structure (I):



5 In another aspect of the present disclosure, there is provided a composition comprising the crystalline form disclosed herein.

In a further aspect of the present disclosure, there is provided a unit dose comprising the composition disclosed herein, wherein the composition is a pharmaceutical composition and the unit dose comprises about 1-100 mg of the tartrate salt.

10 In one example, the present disclosure provides a tartrate salt of the compound of structure (I):



In some embodiments, the tartrate salt disclosed herein may have a molar ratio of tartaric acid to the compound of structure (I) of about 1:1 to about 2:1. For example, the
15 tartrate salt may have a molar ratio of tartaric acid to the compound of structure (I) of about 2:1. Any of the tartrate salts disclosed herein may be a salt of L-(+)-tartaric acid.

In another example, the present disclosure provides a crystalline form of any of the tartrate salts disclosed herein. In some embodiments, the crystalline form is crystalline Form A, having a molar ratio of tartaric acid to the compound of structure (I) of about 2:1. In some
20 examples, Form A can be in substantially pure form. In some embodiments, the

crystalline form comprises Form A. In some embodiments, the crystalline form consists essentially of Form A.

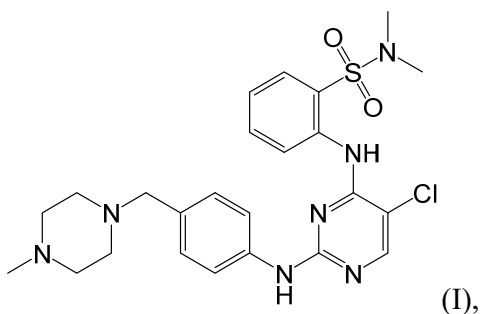
Any of the crystalline forms disclosed herein may be characterized by an x-ray powder diffraction (XRPD) pattern comprising peaks, in units 2-theta, at 11.2 ± 0.2 , 17.1 ± 0.2 , and 19.9 ± 0.2 . Optionally, the crystalline form may further comprise a peak, in units 2-theta, at 15.4 ± 0.2 . Alternatively or in addition, the crystalline form may further comprise a peak, in units 2-theta, at 7.0 ± 0.2 . In some examples, the crystalline form as disclosed herein can be characterized by an XRPD pattern comprising three or more peaks, in units of 2-theta, selected from 7.0 ± 0.2 , 11.2 ± 0.2 , 15.4 ± 0.2 , 16.3 ± 0.2 , 17.1 ± 0.2 , 19.9 ± 0.2 , 21.6 ± 0.2 , and 25.5 ± 0.2 . In othe examples, the XRPD pattern may comprise 4, 5, 6, 7, or 8 peaks, in units of 2-theta, selected from 7.0 ± 0.2 , 11.2 ± 0.2 , 15.4 ± 0.2 , 16.3 ± 0.2 , 17.1 ± 0.2 , 19.9 ± 0.2 , 21.6 ± 0.2 , and 25.5 ± 0.2 . In one specific example, the XRPD pattern is substantially identical to the XRPD pattern shown in Figure 61.

Further, the present disclosure provides a unit dose comprising any of the pharmaceutical compositions disclosed herein. The unit dose may comprise about 1-100 mg of the tartrate salt. In some embodiments, the unit dose disclosed herein may comprise about 1 mg, 4 mg, 16 mg, 25 mg, 50 mg, 75 mg, or 100 mg of the tartrate salt. In some
5 embodiments, the unit dose can be formulated in a gelatin hard capsule for oral administration.

In another example, the present disclosure provides a method of treating a cancer, the method comprising administering to a subject (e.g., a human) in need thereof a therapeutically effective amount of any of the tartrate salts disclosed herein, any of the
10 crystalline forms disclosed herein, any of the pharmaceutical compositions comprising such, or any of the unit doses also disclosed herein.

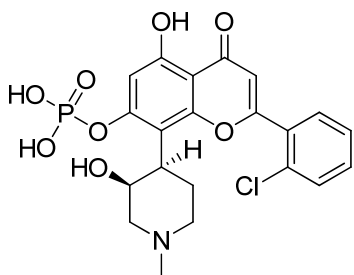
In some embodiments, the method disclosed herein comprises administering to the subject a therapeutically effective amount of a tartrate salt having a molar ratio of tartaric acid to the compound of structure (I) of about 2:1. In some examples, the method comprises
15 administering to the subject a therapeutically effective amount of the crystalline Form A, which may be in substantially pure form.

In a further example, provided herein is a method of treating cancer in a subject comprising administering to the subject a compound of structure (I):



or a pharmaceutically acceptable salt or crystalline form thereof. The compound, or
20 pharmaceutically acceptable salt, or crystalline form thereof, can be administered to the subject orally once daily at a dose from about 1.5 mg/m² to about 65 mg/m², or at a dose of about 20 mg to about 100 mg. The subject may have any of the tumor (e.g., advanced solid tumor) or hematopoietic cancer as disclosed herein. In some embodiments, the subject may
25 have undergone one or more prior cancer therapy, e.g., those disclosed herein.

other examples, the one or more therapeutic agents may comprises an immune checkpoint inhibitor, for example, a PD-1 or PD-L1 inhibitor. Examples of PD-1 inhibitors include, but are not limited to, pembrolizumab, nivolumab, or a combination thereof. Examples of PD-L1 inhibitors include, but are not limited to, atezolizumab, avelumab, durvalumab, or a combination thereof. Alternatively or in addition, the one or more therapeutic agents may comprise a CDK inhibitor, for example, a CDK9 inhibitor, which, in some instances, may be alvocidib, or a pharmaceutically acceptable salt or prodrug thereof. In some examples, the CDK9 inhibitor is a prodrug of alvocidib, which may have the following structure (II'):



(II'), or a pharmaceutically acceptable salt or zwitterionic form thereof.

In some examples, the one or more therapeutic agents comprise a platinum-based chemotherapeutic agents.

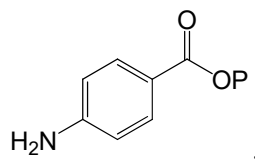
Exemplary additional therapeutic agents to be used in combination with the compound of structure (I), or a pharmaceutically acceptable salt thereof (e.g., any of the tartarate salts disclosed herein) may comprise carboplatin, gemcitabine, bevacizumab, topotecan, rucaparib, olaparib, niraparib, nivolumab, pembrolizumab, atezolizumab, avelumab, durvalumab, ipilimumab, or a combination thereof.

In yet another example, the present disclosure provides a method comprising administering an effective amount of a compound of structure (I):

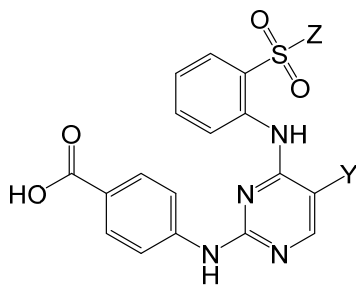
Z is halo or $\text{-NR}^1(\text{R}^2)$; and

R^1 and R^2 are, each independently, hydrogen or $\text{C}_1\text{-C}_8$ alkyl,

with a compound having the following structure:

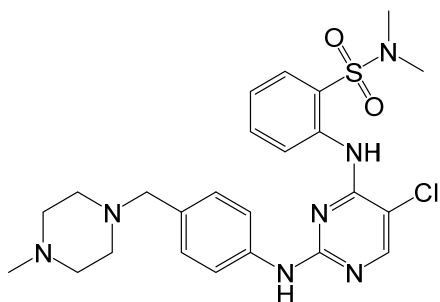


5 wherein P is H or a protecting group, to obtain a compound having the following structure:



In some embodiments, X can be halo or sulfonate (e.g., chloro). Alternatively or in addition, P can be H; Y can be chloro; Z can be $\text{-NR}^1(\text{R}^2)$; R^1 can be $\text{C}_1\text{-C}_8$ alkyl (e.g., methyl); and/or R^2 can be $\text{C}_1\text{-C}_8$ alkyl (e.g., methyl).

10 In yet another example, the present disclosure provides a method for preparing a tartrate salt of the compound of structure (I):



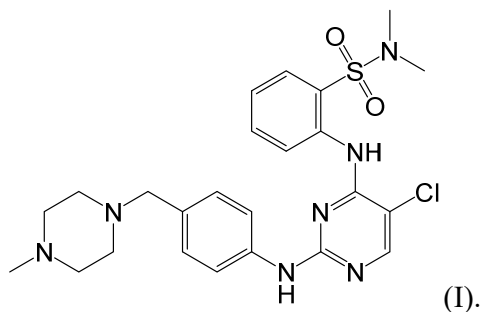
(I). The method may comprise admixing the compound

of structure (I) with tartaric acid. In some examples, the tartaric acid can be L-(+)-tartaric acid. In some embodiments, the tartrate salt is of crystalline Form A, and the method

15 comprises: (a) dissolving the compound of structure (I) in a solvent comprising anisole and ethanol to afford a first solution; (b) adding a solution of (L)-tartaric acid in ethanol to the first solution to afford a second solution; and (c) allowing the tartrate salt of structure (I) to crystallize from the second solution.

CLAIMS

1. A crystalline form of a tartrate salt of the compound of structure (I):



5

2. The crystalline form of claim 1, which is crystalline Form A, having a molar ratio of tartaric acid to the compound of structure (I) of about 2:1.
- 10 3. The crystalline form of claim 2, characterized by an x-ray powder diffraction (XRPD) pattern comprising peaks, in units 2-theta, at 11.2 ± 0.2 , 17.1 ± 0.2 , and 19.9 ± 0.2 .
4. The crystalline form of claim 2, characterized by an XRPD pattern comprising three or more peaks, in units of 2-theta, selected from 7.0 ± 0.2 , 11.2 ± 0.2 , 15.4 ± 0.2 , 16.3 ± 0.2 ,
- 15 17.1 ± 0.2 , 19.9 ± 0.2 , 21.6 ± 0.2 , and 25.5 ± 0.2 .

5. A composition comprising the crystalline form of claim 1.
6. The composition of claim 5, comprising crystalline Form A in substantially pure form.
- 5 7. The composition of claim 5, wherein the composition is a pharmaceutical composition that is formulated for oral administration.
8. A unit dose comprising the composition of claim 5, wherein the composition is a pharmaceutical composition and the unit dose comprises about 1-100 mg of the tartrate salt.
- 10 9. The crystalline form of claim 1, wherein the tartrate salt is a salt of L-(+)-tartaric acid.
10. The crystalline form of claim 2, wherein Form A is in substantially pure form.
- 15 11. The crystalline form of claim 4, wherein the XRPD pattern is substantially identical to the XRPD pattern shown in FIG. 61A.