CLAIMS

What is claimed is:

1. A method of determining sensitivity of a neoplastic cell to a Hec1 inhibitor, comprising:
   obtaining from a patient a sample comprising a neoplastic cell or neoplastic cells;
   forming a detectable complex of at least one of Hec1, Rb, and p53, wherein the at least one of Hec1, Rb, and p53 are derived from the sample;
   using the detectable complex to determine at least one of expression level and status of at least one of Hec1, Rb, and p53 to obtain a test result; and
   comparing the test result with a reference result of a non-neoplastic cell that includes at least one of an expression level and a status of at least one of Hec1, Rb, and p53 of the non-neoplastic cell to thereby predict sensitivity of the neoplastic cell to the Hec1 inhibitor.

2. A method of evaluating a patient having a neoplastic disease for potential treatment with a Hec1 inhibitor, comprising:
   obtaining a patient sample comprising a neoplastic cell or neoplastic cells;
   forming a detectable complex of at least one of Hec1, Rb, and p53;
   using the detectable complex to determine at least one of expression level and status of at least one of Hec1, Rb, and p53 to obtain a test result;
   comparing the test result with a reference result that includes at least one of an expression level and a status of at least one of Hec1, Rb, and p53 of a non-neoplastic reference cell to thereby predict sensitivity of the neoplastic cell to the Hec1 inhibitor; and
   including the patient into a treatment group that receives treatment with a Hec1 inhibitor.

3. The method of claim 1 or claim 2 wherein the step of determining comprises determining expression level of Hec1.

4. The method of claim 3 wherein an increased expression level relative to a corresponding reference result is indicative of sensitivity of the neoplastic cell to the Hec1 inhibitor.

5. The method of claim 1 or claim 2 wherein the step of determining comprises determining status of at least one of Rb and p53.

6. The method of claim 1 or claim 2 wherein a mutated or deleted form of the at least one of the Rb and the p53 relative to a corresponding reference result is indicative of sensitivity of the neoplastic cell to the Hec1 inhibitor.

7. The method of claim 1 or claim 2 wherein the step of determining comprises quantification of a nucleic acid encoding Hec1, Rb, and p53.

8. The method of claim 1 or claim 2 wherein the step of determining comprises sequencing or hybridization or a combination of both of a nucleic acid(s) encoding Hec1, Rb, and p53.

9. The method of claim 1 or claim 2 wherein the step of determining comprises quantification of Hec1 protein, Rb protein, and p53 protein.

10. A method of evaluating a patient having a neoplastic disease for potential treatment with a Hec1 inhibitor, comprising:

determining from a patient sample a molecular type of the neoplastic disease;

forming a detectable complex of at least one of Hec1, Rb, and p53;

using the detectable complex to determine for the molecular type at least one of expression level and status of at least one of Hec1, Rb, and p53;

using the at least one of the expression level and the status of the at least one of Hec1, Rb, and p53 to thereby provide an evaluation result; and

wherein an increased expression level of Hec1 relative to a corresponding reference result and/or presence of a mutated or deleted form of the at least one of the Rb and the p53 relative to a corresponding reference result is predictive of suitability of treatment of the neoplastic disease with a Hec1 inhibitor.

11. The method of claim 10 wherein the neoplastic disease is breast cancer.

12. The method of claim 10 wherein the neoplastic disease is lung cancer.

13. The method of claim 10 wherein the neoplastic disease is colon cancer.

14. The method of claim 10 wherein the neoplastic disease is liver cancer.

15. A method of treating a neoplastic cell that is sensitive to treatment with a Hec1 inhibitor, comprising contacting the neoplastic cell with a Hec1 inhibitor and a second

chemotherapeutic agent at a dosage effective to achieve a synergistic result with respect to growth inhibition of the neoplastic cell, wherein the Hec1 inhibitor is a thiazol-2-yl-isonicotinamide compound.

16. The method of claim 15 wherein the Hec1 inhibitor is selected from the group consisting of N-(4-(4-isopropoxy-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (100951), N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (101001), 2-fluoro-N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (101015), N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-yloxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec110091),N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (110095), and N-(4-(4-(5-(2-(dimethylamino)ethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide, and their salt forms.

17. The method of claim 16 wherein the second chemotherapeutic agent is selected from the group consisting of taxol, doxorubicin, and topotecan.

18. A method of treating a neoplastic cell that is multi-drug resistant or resistant to treatment with imatinib, comprising contacting the neoplastic cell with a Hec1 inhibitor and optionally a second chemotherapeutic agent at a dosage effective to achieve growth inhibition of the neoplastic cell.

19. The method of claim 18 wherein the Hec1 inhibitor is selected from the group consisting of N-(4-(4-isopropoxy-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec100951), N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec101001), 2-fluoro-N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec101015), N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-yloxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec110091),N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec110095), and N-(4-(4-(5-(2-(dimethylamino)ethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide or its salt forms.

CLAIMS

1. A method of determining sensitivity of a neoplastic cell to a Hec1 inhibitor, comprising:
   obtaining a patient sample comprising a neoplastic cell or neoplastic cells;
   forming a detectable complex of at least one of Hec1, Rb, and p53, wherein the at least one of Hec1, Rb, and p53 are derived from the sample;
   using the detectable complex to determine at least one of expression level and status of at least one of Hec1, Rb, and p53 to obtain a test result; and
   comparing the test result with a reference result of a non-neoplastic cell that includes at least one of an expression level and a status of at least one of Hec1, Rb, and p53 of the non-neoplastic cell to thereby predict sensitivity of the neoplastic cell to the Hec1 inhibitor.

2. A method of evaluating a patient having a neoplastic disease for potential treatment with a Hec1 inhibitor, comprising:
   obtaining a patient sample comprising a neoplastic cell or neoplastic cells;
   forming a detectable complex of at least one of Hec1, Rb, and p53;
   using the detectable complex to determine at least one of expression level and status of at least one of Hec1, Rb, and p53 to obtain a test result;
   comparing the test result with a reference result that includes at least one of an expression level and a status of at least one of Hec1, Rb, and p53 of a non-neoplastic reference cell to thereby predict sensitivity of the neoplastic cell to the Hec1 inhibitor; and
   including the patient into a treatment group that receives treatment with a Hec1 inhibitor.

3. The method of claim 1 or claim 2, wherein the step of determining comprises determining expression level of Hec1.

4. The method of claim 3, wherein an increased expression level relative to a corresponding reference result is indicative of sensitivity of the neoplastic cell to the Hec1 inhibitor.

5. The method of claim 1 or claim 2, wherein the step of determining comprises determining status of at least one of Rb and p53.

6. The method of claim 1 or claim 2, wherein a mutated or deleted form of the at least one of the Rb and the p53 relative to a corresponding reference result is indicative of sensitivity of the neoplastic cell to the Hec1 inhibitor.

7. The method of claim 1 or claim 2, wherein the step of determining comprises quantification of a nucleic acid encoding Hec1, Rb, and p53.

8. The method of claim 1 or claim 2, wherein the step of determining comprises sequencing or hybridization or a combination of both of a nucleic acid(s) encoding Hec1, Rb, and p53.

9. The method of claim 1 or claim 2, wherein the step of determining comprises quantification of Hec1 protein, Rb protein, and p53 protein.

10. A method of evaluating a patient having a neoplastic disease for potential treatment with a Hec1 inhibitor, comprising:

    determining from a patient sample a molecular type of the neoplastic disease;

    forming a detectable complex of at least one of Hec1, Rb, and p53;

    using the detectable complex to determine for the molecular type at least one of expression level and status of at least one of Hec1, Rb, and p53;

    using the at least one of the expression level and the status of the at least one of Hec1, Rb, and p53 to thereby provide an evaluation result; and

    wherein an increased expression level of Hec1 relative to a corresponding reference result and/or presence of a mutated or deleted form of the at least one of the Rb and the p53 relative to a corresponding reference result is predictive of suitability of treatment of the neoplastic disease with a Hec1 inhibitor.

11. The method of claim 10, wherein the neoplastic disease is breast cancer.

12. The method of claim 10, wherein the neoplastic disease is lung cancer.

13. The method of claim 10, wherein the neoplastic disease is colon cancer.

14. The method of claim 10, wherein the neoplastic disease is liver cancer.

15. A thiazol-2-yl-isonicotinamide compound and a second chemotherapeutic agent at a dosage effective to achieve a synergistic result with respect to growth inhibition of a neoplastic cell, for use in the treatment of a neoplastic cell.

16. The compound of claim 15, wherein the thiazol-2-yl-isonicotinamide is selected from the group consisting of N-(4-(4-isopropoxy-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (100951), N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (101001), 2-fluoro-N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (101015), N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-yloxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec110091),N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (110095), and N-(4-(4-(5-(2-(dimethylamino)ethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide, and their salt forms.

17. The compound of claim 16, wherein the second chemotherapeutic agent is selected from the group consisting of taxol, doxorubicin, and topotecan.

18. A Hec1 inhibitor and optionally a second chemotherapeutic agent at a dosage effective to achieve growth inhibition of a neoplastic cell for use in the treatment of a neoplastic cell that is multi-drug resistant or resistant to treatment with imatinib.

19. The inhibitor of claim 18, wherein the Hec1 inhibitor is selected from the group consisting of N-(4-(4-isopropoxy-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec100951), N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec101001), 2-fluoro-N-(4-(4-(4-methoxyphenoxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec101015), N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-yloxy)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec110091),N-(4-(4-(5-(2-methoxyethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide (Hec110095), and N-(4-(4-(5-(2-(dimethylamino)ethoxy)pyrazin-2-ylthio)-2,6-dimethylphenyl)thiazol-2-yl)isonicotinamide or its salt forms.