Claims:

1. An *in vitro* method for inhibiting cell proliferation in a tumorigenic cell comprising the steps of: administering to a cell an inhibitor of glycine dehydrogenase (GLDC) expression.

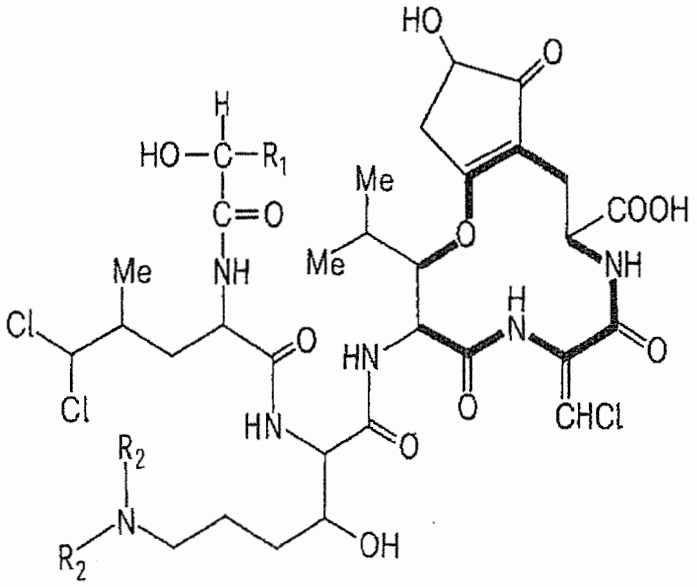
2. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises a small interfering RNA.

3. The *in vitro* method of claim 2 wherein the small interfering RNA comprises SEQ ID NO. 3.; SEQ ID NO. 6.; SEQ ID NO. 7.; SEQ ID NO. 8.; or SEQ ID NO. 9.

4. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises an antibody is capable of binding selectively a GLDC protein comprising SEQ ID No. 2.

5. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises a ~~composition~~ compound $C_{31}H_{45}O_{13}N_6Cl_3$.

6. The *in vitro* method of claim 5 wherein the ~~composition~~ compound has a structure of formula I:

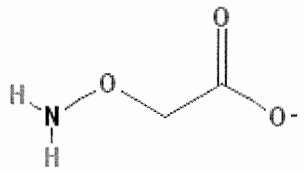


I

Wherein R_1 = OH and R_2 = H

7. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises an (aminooxy) acetate ~~composition~~ compound $C_2H_4NO_3$

8. The *in vitro* method of claim 7 wherein the (aminooxy) acetate ~~composition~~ compound has a structure of formula III:



III

9. The *in vitro* method of any one of claims 1 to 8 further comprising the step of adding a chemotherapeutic agent to the cell.

10. The *in vitro* method of claim 9 wherein the chemotherapeutic agent is selected from Adriamycin (ADR), Etoposide (ETO, Nocodazole, cisplatin, platinum,

carboplatin, gemcitabine, paclitaxel, docetaxel, vinorelbine, topotecan, irinotecan; tyrosine kinase inhibitor; Axitinib, Bosutinib, Cediranib, Dasatinib, Erlotinib, Gefitinib, Imatinib, Lapatinib, Lastaurtinib, Nilotinib, semaxanib, sunitinib, vandetanib, vatalanib ; TNF polypeptides, TRAIL, TRAIL R1, TRAIL R2, FasL, Exisulind, polyketide, methotrexate or apoptosis inducing micro-RNA.

11. The *in vitro* method of claim 9 wherein the chemotherapeutic agent comprises methotrexate.

~~12. The method of any one of claims 1 to 11 wherein the cell is *in vitro*.~~

~~13. The method of any one of claims 1 to 11 wherein the cell is *in vivo*.~~

~~14~~12. The *in vitro* method of any one of claims 1 to ~~13~~ 11 wherein the cell is a lung cancer cell.

~~15~~13. The *in vitro* method of claim ~~14~~ 12 wherein the lung cancer cell is a tumor initiating cell having increased expression of CD166 on the cell surface.

~~16~~14. A ~~compound~~ composition comprising an inhibitor of GLDC expression for use in treating cancer.

~~17~~15. The ~~compound~~ composition of claim ~~16~~ 14 wherein the inhibitor of GLDC comprises a small interfering RNA.

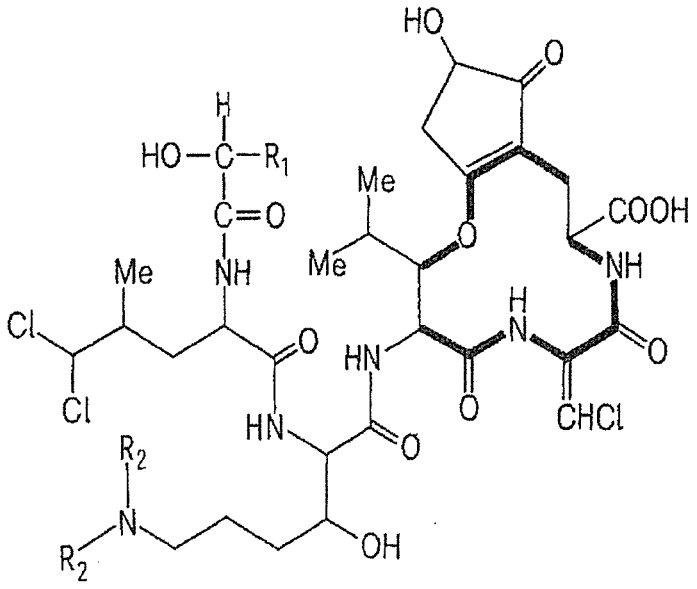
~~18~~16. The ~~compound~~ composition of claim ~~17~~ 15 wherein the small interfering RNA comprises SEQ ID NO. 3.; SEQ ID NO. 6.; SEQ ID NO. 7.; SEQ ID NO. 8.; or SEQ ID NO. 9.

~~19~~17. The ~~compound~~ composition of claim ~~16~~ 14 wherein the inhibitor of GLDC comprises an antibody is capable of binding selectively a GLDC protein comprising SEQ ID No. 2.

~~20~~18. The ~~compound~~ composition of claim ~~16~~ 14 wherein the inhibitor of GLDC

comprises a ~~composition~~ compound $C_{31}H_{45}O_{13}N_6Cl_3$.

~~21~~19. The ~~compound~~ composition of claim ~~20~~ 18 wherein the ~~composition~~ compound has a structure of formula I:

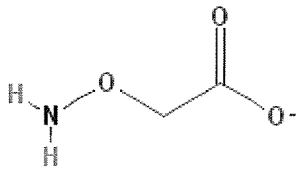


I

Wherein R_1 = OH and R_2 = H

~~22~~20. The ~~compound~~ composition of claim ~~16~~ 14 wherein the inhibitor of GLDC comprises an (aminooxy) acetate ~~composition~~ compound $C_2H_4NO_3$

~~23~~21. The ~~compound~~ composition of claim ~~22~~ 20 wherein the (aminooxy) acetate ~~composition~~ compound has a structure of formula III:



III

~~2422~~. The ~~compound~~ composition of any one of claims ~~16~~ 14 to ~~23~~ 21 further comprises a DNA damaging agent.

~~2523~~. The ~~compound~~ composition of claim ~~24~~ 22 wherein the -DNA damaging agent is a chemotherapeutic agent.

~~2624~~. The ~~compound~~ composition of claim ~~25~~ 23 wherein the chemotherapeutic agent is selected from Adriamycin (ADR), Etoposide (ETO, Nocodazole, cisplatin, platinum, carboplatin, gemcitabine, paclitaxel, docetaxel, vinorelbine, topotecan, irinotecan; tyrosine kinase inhibitor; Axitinib, Bosutinib, Cediranib, Dasatinib, Erlotinib, Gefitinib, Imatinib, Lapatinib, Lastaurtinib, Nilotinib, semaxanib, sunitinib, vandetanib, vatalanib ; TNF polypeptides, TRAIL, TRAIL R1, TRAIL R2, FasL, Exisulind, polyketide, methotrexate or apoptosis inducing micro-RNA.

~~2725~~. The ~~compound~~ composition of claim ~~25~~ 23 wherein the chemotherapeutic agent comprises methotrexate.

~~2826~~. The ~~compound~~ composition of any one of claims ~~16~~ 14 to ~~27~~ 25 wherein the cancer is lung cancer.

~~2927~~. A method of analyzing a cell expression profile for determining whether the cell has been isolated from cancerous tissue comprising the steps of (a) measuring an amount of glycine dehydrogenase (GLDC) nucleic acid or polypeptide in the cell isolated from tissue suspected of being cancerous; Comparing the amount of GLDC nucleic acid or polypeptide present in the cell to the amount of GLDC nucleic acid or polypeptide in a sample isolated from normal, a non-cancerous cell, wherein an amplified amount of GLDC nucleic acid or polypeptide in the cell relative to the amount of GLDC nucleic acid or polypeptide in the non-cancerous cell indicates cancer is present in the cell; and wherein the absence of an amplified amount of GLDC nucleic acid or polypeptide in the cell relative to the amount of GLDC nucleic acid or polypeptide in the non-

cancerous cell indicates there is no cancer present in the cell.

~~30~~28. The method of claim ~~29~~27 further comprising the steps of detecting measuring an amount of LIN28B nucleic acid or polypeptide in the cell isolated from tissue suspected of being cancerous; Comparing the amount of LIN28B nucleic acid or polypeptide present in the cell to the amount of LIN28B nucleic acid or polypeptide in a sample isolated from normal, a non-cancerous cell, wherein an amplified amount of LIN28B nucleic acid or polypeptide in the cell relative to the amount of LIN28B nucleic acid or polypeptide in the non-cancerous cell indicates cancer is present in the cell; and wherein the absence of an amplified amount of LIN28B nucleic acid or polypeptide in the cell relative to the amount of LIN28B nucleic acid or polypeptide in the non-cancerous cell indicates there is no cancer present in the cell.

~~31~~29. The method of claim ~~29~~27 or ~~30~~28 further comprising the steps of isolating lung cancer stem cells prior to determining the expression profile of GLDC in the cell suspected of being cancerous.

~~32~~30. A method of predicting the effectiveness of a GLDC inhibitor comprising the step of determining a first expression profile of GLDC nucleic acid or polypeptide in a cell isolated from a subject who is not diagnosed with cancer; determining a second expression profile of GLDC nucleic acid or polypeptide in a cell isolated from a subject who is diagnosed with cancer and comparing the first and second expression profile whereby when the second expression profile is 1.5 to 16 fold more than the first expression profile or preferably 2 to 10 fold more than the first expression profile the subject who is diagnosed with cancer will benefit from treatment with the GLDC inhibitor.

~~33~~31. A method for screening for an antagonist of GLDC polynucleotide expression comprising the steps of: (a) contacting a tumorigenic cell that is over expressing GLDC polypeptide with a sample compound; (b) measuring the GLDC expression profile in both the presence and absence of the sample

compound; and, Wherein a decrease in GLDC polypeptide expression in the presence of the sample compound in relation to the GLDC polypeptide expression in the absence of the sample compound indicates the sample compound is the antagonist.

Claims:

1. An *in vitro* method for inhibiting cell proliferation in a tumorigenic cell comprising the steps of: administering to a cell an inhibitor of glycine dehydrogenase (GLDC) expression.

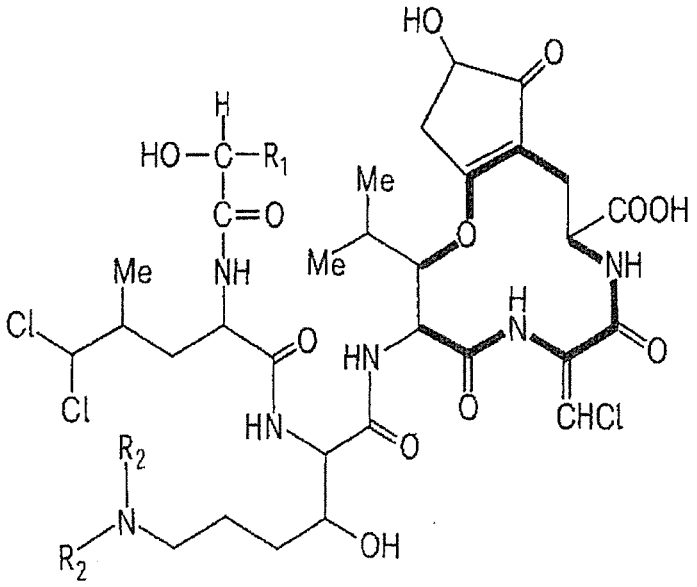
2. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises a small interfering RNA.

3. The *in vitro* method of claim 2 wherein the small interfering RNA comprises SEQ ID NO. 3.; SEQ ID NO. 6.; SEQ ID NO. 7.; SEQ ID NO. 8.; or SEQ ID NO. 9.

4. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises an antibody is capable of binding selectively a GLDC protein comprising SEQ ID No. 2.

5. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises a compound $C_{31}H_{45}O_{13}N_6Cl_3$.

6. The *in vitro* method of claim 5 wherein the compound has a structure of formula I:

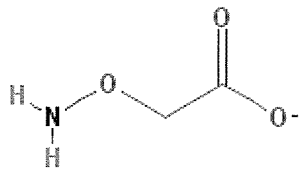


I

Wherein R_1 = OH and R_2 = H

7. The *in vitro* method of claim 1 wherein the GLDC inhibitor comprises an (aminooxy) acetate compound $\underline{C_2H_4NO_3}$

8. The *in vitro* method of claim 7 wherein the (aminooxy) acetate compound has a structure of formula III:



III

9. The *in vitro* method of any one of claims 1 to 8 further comprising the step of adding a chemotherapeutic agent to the cell.

10. The *in vitro* method of claim 9 wherein the chemotherapeutic agent is selected from Adriamycin (ADR), Etoposide (ETO, Nocodazole, cisplatin, platinum,

carboplatin, gemcitabine, paclitaxel, docetaxel, vinorelbine, topotecan, irinotecan; tyrosine kinase inhibitor; Axitinib, Bosutinib, Cediranib, Dasatinib, Erlotinib, Gefitinib, Imatinib, Lapatinib, Lastaurtinib, Nilotinib, semaxanib, sunitinib, vandetanib, vatalanib ; TNF polypeptides, TRAIL, TRAIL R1, TRAIL R2, FasL, Exisulind, polyketide, methotrexate or apoptosis inducing micro-RNA.

11. The *in vitro* method of claim 9 wherein the chemotherapeutic agent comprises methotrexate.

12. The *in vitro* method of any one of claims 1 to 11 wherein the cell is a lung cancer cell.

13. The *in vitro* method of claim 12 wherein the lung cancer cell is a tumor initiating cell having increased expression of CD166 on the cell surface.

14. A composition comprising an inhibitor of GLDC expression for use in treating cancer.

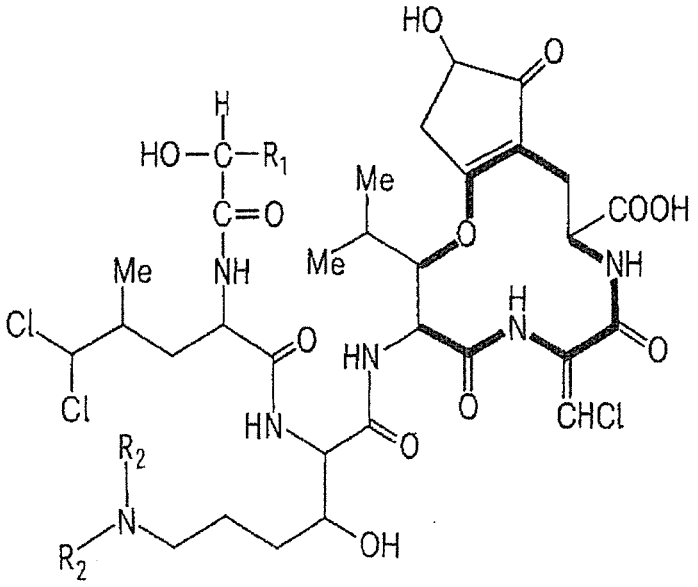
15. The composition of claim 14 wherein the inhibitor of GLDC comprises a small interfering RNA.

16. The composition of claim 15 wherein the small interfering RNA comprises SEQ ID NO. 3.; SEQ ID NO. 6.; SEQ ID NO. 7.; SEQ ID NO. 8.; or SEQ ID NO. 9.

17. The composition of claim 14 wherein the inhibitor of GLDC comprises an antibody is capable of binding selectively a GLDC protein comprising SEQ ID No. 2.

18. The composition of claim 14 wherein the inhibitor of GLDC comprises a compound $C_{31}H_{45}O_{13}N_6Cl_3$.

19. The composition of claim 18 wherein the compound has a structure of formula I:

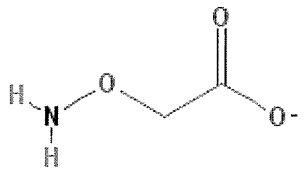


I

Wherein R_1 = OH and R_2 = H

20. The composition of claim 14 wherein the inhibitor of GLDC comprises an (aminooxy) acetate compound $\underline{C_2H_4NO_3}$

21. The composition of claim 20 wherein the (aminooxy) acetate compound has a structure of formula III:



III

22. The composition of any one of claims 14 to 21 further comprises a DNA damaging agent.

23. The composition of claim 22 wherein the DNA damaging agent is a chemotherapeutic agent.

24. The composition of claim 23 wherein the chemotherapeutic agent is selected from Adriamycin (ADR), Etoposide (ETO, Nocodazole, cisplatin, platinum, carboplatin, gemcitabine, paclitaxel, docetaxel, vinorelbine, topotecan, irinotecan; tyrosine kinase inhibitor; Axitinib, Bosutinib, Cediranib, Dasatinib, Erlotinib, Gefitinib, Imatinib, Lapatinib, Lastaurtinib, Nilotinib, semaxanib, sunitinib, vandetanib, vatalanib ; TNF polypeptides, TRAIL, TRAIL R1, TRAIL R2, FasL, Exisulind, polyketide, methotrexate or apoptosis inducing micro-RNA.

25. The composition of claim 23 wherein the chemotherapeutic agent comprises methotrexate.

26. The composition of any one of claims 14 to 25 wherein the cancer is lung cancer.

27. A method of analyzing a cell expression profile for determining whether the cell has been isolated from cancerous tissue comprising the steps of (a) measuring an amount of glycine dehydrogenase (GLDC) nucleic acid or polypeptide in the cell isolated from tissue suspected of being cancerous; Comparing the amount of GLDC nucleic acid or polypeptide present in the cell to the amount of GLDC nucleic acid or polypeptide in a sample isolated from normal, a non-cancerous cell, wherein an amplified amount of GLDC nucleic acid or polypeptide in the cell relative to the amount of GLDC nucleic acid or polypeptide in the non-cancerous cell indicates cancer is present in the cell; and wherein the absence of an amplified amount of GLDC nucleic acid or polypeptide in the cell relative to the amount of GLDC nucleic acid or polypeptide in the non-cancerous cell indicates there is no cancer present in the cell.

28. The method of claim 27 further comprising the steps of detecting measuring an amount of LIN28B nucleic acid or polypeptide in the cell isolated from tissue suspected of being cancerous; Comparing the amount of LIN28B nucleic acid or polypeptide present in the cell to the amount of LIN28B nucleic acid or polypeptide in a sample isolated from normal, a non-cancerous cell, wherein an amplified amount of LIN28B nucleic acid or polypeptide in the cell relative to the

amount of LIN28B nucleic acid or polypeptide in the non-cancerous cell indicates cancer is present in the cell; and wherein the absence of an amplified amount of LIN28B nucleic acid or polypeptide in the cell relative to the amount of LIN28B nucleic acid or polypeptide in the non-cancerous cell indicates there is no cancer present in the cell.

29. The method of claim 27 or 28 further comprising the steps of isolating lung cancer stem cells prior to determining the expression profile of GLDC in the cell suspected of being cancerous.

30. A method of predicting the effectiveness of a GLDC inhibitor comprising the step of determining a first expression profile of GLDC nucleic acid or polypeptide in a cell isolated from a subject who is not diagnosed with cancer; determining a second expression profile of GLDC nucleic acid or polypeptide in a cell isolated from a subject who is diagnosed with cancer and comparing the first and second expression profile whereby when the second expression profile is 1.5 to 16 fold more than the first expression profile or preferably 2 to 10 fold more than the first expression profile the subject who is diagnosed with cancer will benefit from treatment with the GLDC inhibitor.

31. A method for screening for an antagonist of GLDC polynucleotide expression comprising the steps of: (a) contacting a tumorigenic cell that is over expressing GLDC polypeptide with a sample compound; (b) measuring the GLDC expression profile in both the presence and absence of the sample compound; and, Wherein a decrease in GLDC polypeptide expression in the presence of the sample compound in relation to the GLDC polypeptide expression in the absence of the sample compound indicates the sample compound is the antagonist.