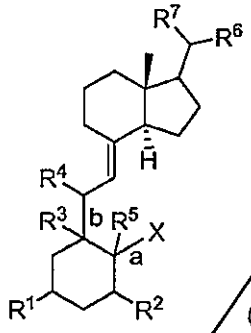
WHAT IS CLAIMED IS:

1. A method of preventing or reducing chemotherapy-induced myelosuppression in a subject being treated with a chemotherapeutic agent which induces myelosuppression, comprising administering to the subject an effective amount of a vitamin D compound or a pharmaceutically acceptable salt, prodrug or solvate thereof.

2. The method of claim 1, wherein the vitamin D compound is of Formula (I):



(I)

wherein

a and b are each independently a single or double bond

X is $-CH_2$ when a is a double bond, or X is hydrogen or a hydroxyl substituted alkyl when a is a single bond;

R^1 is hydrogen, hydroxyl, alkoxy, tri-alkyl silyl or a substituted or unsubstituted alkyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^2 is hydrogen, hydroxyl, -O-trialkyl silyl, or a substituted or unsubstituted alkyl, alkoxyl or alkenyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^3 is absent when b is a double bond or R^3 is hydrogen, hydroxyl or alkyl, or R^3 and R^1 together with the carbon atoms to which they are attached may be linked to form 5-7 membered carbocyclic ring when b is a single bond;

R^4 is hydrogen, halogen or hydroxyl;

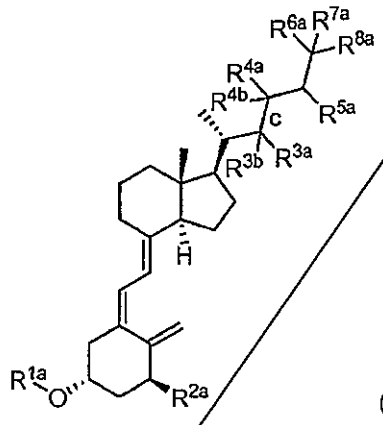
R^5 is absent when a is a double bond or R^5 is hydrogen, halogen or hydroxyl when a is a single bond;

R^6 is a substituted or unsubstituted alkyl, alkenyl, alkynyl, cycloalkyl, heterocyclicyl, alkyl-O-alkyl, alkyl-CO_2-alkyl independently substituted with one to five, hydroxyl, oxo, halogen, alkoxyl, aryl, heteroaryl, cyano, nitro or -NR'R" moieties;

R^7 is a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl, halogen, alkoxyl, aryl, heteroaryl, cyano, nitro or -NR'R" moieties; and,

R' and R" are each, independently, hydrogen, hydroxyl, halogen, -C_{1-7} alkyl or -C_{1-7} alkoxyl such that said CIM is prevented or reduced.

3. The method of claim 1, wherein the vitamin D compound is represented by Formula (II):



(II)

wherein

c is a single or double bond;

R^{1a} is hydrogen, tri-alkyl silyl or a substituted or unsubstituted alkyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^{2a} is hydrogen, hydroxyl, -O-trialkyl silyl, or a substituted or unsubstituted alkyl, alkoxyl or alkenyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^{3a}, R^{4a} are absent when c is a double bond, or are each independently hydrogen, hydroxyl, halogen, alkoxyl or a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl or halogen moieties when c is a single bond

R^{3b}, R^{4b}, R^{5a}, R^{6a}, R^{7a} and R^{8a} are each, independently, hydrogen, hydroxyl, halogen, alkoxyl or a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl or halogen moieties, or any two of R^{6a}, R^{7a} and R^{8a} may be linked to form a 3-7 membered carbocyclic ring.

4. The method of claim 1, wherein said vitamin D compound comprises 1,25-dihydroxyvitamin D3; 1,25-dihydroxy-16-ene-23-yne-cholecalciferol; 1,25-dihydroxy-

16-ene-yne-cholecalciferol; 1α-hydroxyvitamin D3; 1α,24-dihydroxyvitamin D3, MC 903, or combinations thereof.

5. The method of claim 1, wherein said vitamin D compound is administered topically or systemically.

6. The method of claim 1, wherein the chemotherapy involves the use of a cell cycle-specific chemotherapeutic agent.

7. The method of claim 1, wherein the chemotherapy involves the use of a nonspecific cell cycle chemotherapeutic agent.

8. The method of claim 1, wherein the chemotherapeutic agent is a cell cycle-specific agent in combination with a nonspecific cell cycle agent.

9. The method of claim 1, wherein said vitamin D compound is administered prior to the administration of said chemotherapeutic agent.

10. The method of claim 1, wherein said vitamin D compound is co-administered with said chemotherapeutic agent.

11. The method of claim 1, wherein the subject is a mammal.

12. The method of claim 1, wherein the vitamin D compound is co-administered with an additional agent that counteracts chemotherapy-induced anemia.

13. The method of claim 12, wherein the agent is a growth factor.

14. The method of claim 13, wherein said growth factor is G-CSF or EPO.

15. The method of claim 1, wherein the vitamin D compound is formulated as a sterile solution comprising between about 50 μg/mL and about 400 μg/mL of the vitamin D compound.

16. The method of claim 15, wherein the formulation further comprises anhydrous undenatured ethanol and polysorbate 20.

17. The method of claim 15, wherein the formulation is diluted 1:10 in 0.9% sodium chloride solution prior to administration to the subject.

18. The method of claim 15, wherein the formulation comprises about 75 µg/mL vitamin D compound.

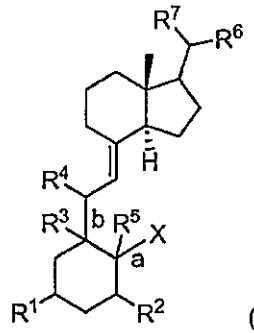
19. The method of claim 15, wherein the formulation comprises about 345 µg/mL vitamin D compound.

20. The method of claim 15, wherein the vitamin D compound is calcitriol.

21. A method to determine an optimal therapeutic dose of a vitamin D compound, comprising

administering to a subject a series of test amounts of the vitamin D compound or a pharmaceutically acceptable salt thereof, and

determining the minimal dose required to protect the myeloid cells of the subject from chemotherapy-induced myelosuppresion without eliciting a hypercalcemic effect, wherein the vitamin D compound is represented by Formula (I):



(I)

wherein

a and b are each independently a single or double bond

X is -CH_2 when a is a double bond, or X is hydrogen or a hydroxyl substituted alkyl when a is a single bond;

R^1 is hydrogen, hydroxyl, alkoxy, tri-alkyl silyl or a substituted or unsubstituted alkyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^2 is hydrogen, hydroxyl, -O-trialkyl silyl, or a substituted or unsubstituted alkyl, alkoxyl or alkenyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^3 is absent when b is a double bond or R^3 is hydrogen, hydroxyl or alkyl, or R^3 and R^1 together with the carbon atoms to which they are attached may be linked to form 5-7 membered carbocyclic ring when b is a single bond;

R^4 is hydrogen, halogen or hydroxyl;

R^5 is absent when a is a double bond or R^5 is hydrogen, halogen or hydroxyl when a is a single bond;

R^6 is a substituted or unsubstituted alkyl, alkenyl, alkynyl, cycloalkyl, heterocyclicyl, alkyl-O-alkyl, alkyl-CO_2-alkyl independently substituted with one to five, hydroxyl, oxo, halogen, alkoxyl, aryl, heteroaryl, cyano, nitro or -NR'R" moieties;

R^7 is a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl, halogen, alkoxyl, aryl, heteroaryl, cyano, nitro or -NR'R" moieties; and,

R' and R" are each, independently, hydrogen, hydroxyl, halogen, -C_{1-7} alkyl or -C_{1-7} alkoxyl .

22. A method of reducing the risk of or preventing a myelosuppression-induced disorder in a subject being treated with a chemotherapeutic agent that induces myelosuppression,comprising administering to the subject an effective amount of a vitamin D compound or a pharmaceutically acceptable salt, prodrug or solvate thereof such that said myelosuppression-induced disorder is prevented of the risk of myelosuppression-induced disorder is reduced.

23. The method of claim 22, wherein said myelosuppression-induced disorder is myelosuppression-induced infection.

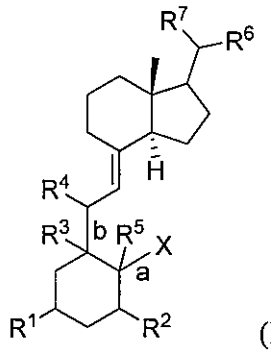
24. A methods of preventing depletion of neutrophils in a subject being treated with a chemotherapeutic agent comprising, administering to the subject an effective amount

of a vitamin D compound or a pharmaceutically acceptable salt, prodrug or solvate thereof, such that the depletion of neutorphils in said subject is prevented.

WHAT IS CLAIMED IS:

1. Use of a vitamin D compound or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for preventing or reducing chemotherapy-induced myelosuppression in a subject having cancer, which is to be administered to the subject prior to administration of a chemotherapeutic agent which induces myelosuppression to treat the cancer.

2. The use of claim 1, wherein the vitamin D compound is of Formula (I):



(I)

wherein

a and b are each independently a single or double bond

X is $-CH_2$ when a is a double bond, or X is hydrogen or a hydroxyl substituted alkyl when a is a single bond;

R^1 is hydrogen, hydroxyl, alkoxy, tri-alkyl silyl or a substituted or unsubstituted alkyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^2 is hydrogen, hydroxyl, -O-trialkyl silyl, or a substituted or unsubstituted alkyl, alkoxyl or alkenyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^3 is absent when b is a double bond or R^3 is hydrogen, hydroxyl or alkyl, or R^3 and R^1 together with the carbon atoms to which they are attached may be linked to form 5-7 membered carbocyclic ring when b is a single bond;

R^4 is hydrogen, halogen or hydroxyl;

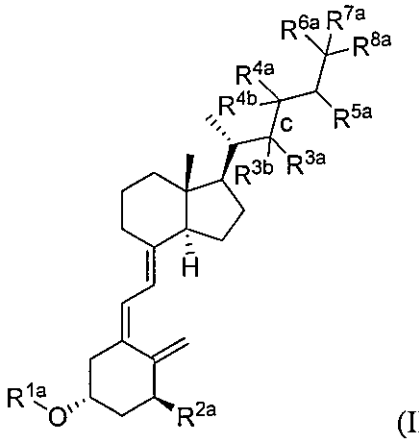
R^5 is absent when a is a double bond or R^5 is hydrogen, halogen or hydroxyl when a is a single bond;

R^6 is a substituted or unsubstituted alkyl, alkenyl, alkynyl, cycloalkyl, heterocyclicyl, alkyl-O-alkyl, alkyl-CO_2-alkyl independently substituted with one to five, hydroxyl, oxo, halogen, alkoxyl, aryl, heteroaryl, cyano, nitro or -NR'R" moieties;

R^7 is a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl, halogen, alkoxyl, aryl, heteroaryl, cyano, nitro or -NR'R" moieties; and,

R' and R" are each, independently, hydrogen, hydroxyl, halogen, -C_{1-7} alkyl or -C_{1-7} alkoxyl such that said chemotherapy-induced myelosuppression (CIM) is prevented or reduced.

3. The use of claim 1, wherein the vitamin D compound is represented by Formula (II):



(II)

wherein

c is a single or double bond;

R^{1a} is hydrogen, tri-alkyl silyl or a substituted or unsubstituted alkyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^{2a} is hydrogen, hydroxyl, -O-trialkyl silyl, or a substituted or unsubstituted alkyl, alkoxyl or alkenyl, independently substituted with one to three halogen, hydroxyl, cyano or -NR'R" moieties;

R^{3a}, R^{4a} are absent when c is a double bond, or are each independently hydrogen, hydroxyl, halogen, alkoxyl or a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl or halogen moieties when c is a single bond

R^{3b}, R^{4b}, R^{5a}, R^{6a}, R^{7a} and R^{8a} are each, independently, hydrogen, hydroxyl, halogen, alkoxyl or a substituted or unsubstituted alkyl independently substituted with one to three hydroxyl or halogen moieties, or any two of R^{6a}, R^{7a} and R^{8a} may be linked to form a 3-7 membered carbocyclic ring.

4. The use of claim 1, wherein said vitamin D compound comprises 1,25-dihydroxyvitamin D3; 1,25-dihydroxy-16-ene-23-yne-cholecalciferol; 1β-hydroxyvitamin D3; 1β,24-dihydroxyvitamin D3, MC 903, or combinations thereof.

5. The use of claim 1, wherein said vitamin D compound is administered topically or systemically.

6. The use of claim 1, wherein the chemotherapy involves the use of a cell cycle-specific chemotherapeutic agent.

7. The use of claim 1, wherein the chemotherapy involves the use of a nonspecific cell cycle chemotherapeutic agent.

8. The use of claim 1, wherein the chemotherapeutic agent is a cell cycle-specific agent in combination with a nonspecific cell cycle agent.

9. The use of claim 1, wherein said vitamin D compound is administered about 3, 3.5 or 4 days prior to the administration of said chemotherapeutic agent.

10. The use of claim 1, wherein the subject is a mammal.

11. The use of claim 1, wherein the vitamin D compound is co-administered with an additional agent that counteracts chemotherapy-induced anemia.

12. The use of claim 11, wherein the agent is a growth factor.

13. The use of claim 12, wherein said growth factor is granulocyte-colony stimulating factor (G-CSF) or erythropoietin (EPO).

14. The use of claim 1, wherein the vitamin D compound is formulated as a sterile solution comprising between about 50 μg/mL and about 400 μg/mL of the vitamin D compound.

15. The use of claim 14, wherein the formulation further comprises anhydrous undenatured ethanol and polysorbate 20.

16. The use of claim 14, wherein the formulation is diluted 1:10 in 0.9% sodium chloride solution prior to administration to the subject.

17. The use of claim 14, wherein the formulation comprises about 75 μg/mL vitamin D compound.

18. The use of claim 14, wherein the formulation comprises about 345 μg/mL vitamin D compound.

19. The use of claim 14, wherein the vitamin D compound is calcitriol.

20. Use of a vitamin D compound or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for reducing the risk of or preventing a disorder caused by chemotherapy-induced myelosuppression in a subject having cancer, which is to be administered to the subject prior to

administration of a chemotherapeutic agent that induces myelosuppression to treat the cancer.

21. The use of claim 20, wherein said disorder is an infection.

22. Use of a vitamin D compound or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for preventing depletion of neutrophils caused by chemotherapy-induced myelosuppression in a subject having cancer, which is to be administered to the subject prior to administration of a chemotherapeutic agent that induces myelosuppression to treat the cancer.