Claims

1. A therapeutic agent capable of directly or indirectly having an effect on the proteins N-methyl-D-aspartate (NMDA), Cyclooxygenase-2 (COX-2), Tumour Necrosis factor alpha (TNF-a), Nuclear factor-kappa B (NFκB), Cyclin-dependent kinases, e.g. CDK2/A and CDK5/p25, Histone acetyltransferase (HAT) and Farnesyltransferase, simultaneously, sequentially or separately

2. A therapeutic agent according to claim 1 wherein the therapeutic agent is dexanabinol or a derivative thereof.

3. A therapeutic agent according to claims 1 or 2 for the apoptosis of cancer cells wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, mesothelioma, liver cancer, intrahepatic bile duct cancer, oesophageal cancer, pancreatic cancer, stomach cancer, laryngeal cancer, brain cancer, ovarian cancer, testicular cancer, cervical cancer, oral cancer, pharyngeal cancer, renal cancer, thyroid cancer, uterine cancer, urinary bladder cancer, hepatocellular carcinoma, thyroid carcinoma, osteosarcoma, small cell lung cancer, leukaemia, myeloma, gastric carcinoma and metastatic cancers.

4. A therapeutic agent according to any preceding claim for the apoptosis of cancer cells wherein the cancer cells are selected from one or more of pancreatic carcinoma, glioblastoma, gastric carcinoma, oesophageal carcinoma, ovarian carcinoma, renal carcinoma and thyroid carcinoma.

5. A therapeutic agent according to anyone of claims 1 to 3 for the apoptosis of cancer cells wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, and metastatic cancers.

6. Dexanabinol, or a derivative thereof, for the apoptosis of cancer in a patient, wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, mesothelioma, liver cancer, intrahepatic bile duct cancer, oesophageal cancer, pancreatic cancer, stomach cancer, laryngeal cancer, brain cancer, ovarian cancer, testicular cancer, cervical cancer, oral cancer, pharyngeal cancer, renal cancer, thyroid cancer, uterine cancer, urinary bladder cancer, hepatocellular carcinoma, thyroid carcinoma, osteosarcoma, small cell lung cancer, leukaemia, myeloma, gastric carcinoma and metastatic cancers.

7. Dexanabinol, or a derivative thereof, according to claim 6 for the apoptosis of cancer cells wherein the cancer cells are selected from one or more of pancreatic carcinoma, glioblastoma, gastric carcinoma, oesophageal carcinoma, ovarian carcinoma, renal carcinoma and thyroid carcinoma.

8. Dexanabinol, or a derivative thereof, according to claim 6 wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, and metastatic cancers.

9. Dexanabinol, or a derivative thereof, according to anyone of claims 6 to 8 which comprises a therapeutically effective amount sufficient for apoptosis of a cancer cell.

10. Dexanabinol, or a derivative thereof, according to anyone of claims 6 to 9 wherein the dexanabinol, or a derivative thereof, directly or indirectly has an effect on the proteins N-methyl-D-aspartate (NMDA), Cyclooxygenase-2 (COX-2), Tumour Necrosis factor alpha (TNF-a), Nuclear factor-kappa B (NFκB), Cyclin-dependent kinases, e.g. CDK2/A and CDK5/p25, Histone acetyltransferase (HAT) and Farnesyltransferase, simultaneously, sequentially or separately.

11. Dexanabinol, or a derivative thereof, according to anyone of claims 6 to 10 which comprises a therapeutically effective amount of dexanabinol, or a derivative thereof, sufficient to inhibit tumourigenesis of a cancer cell.

12. Dexanabinol, or a derivative thereof, according to anyone of claims 6 to 11 in combination with another cancer treating therapeutic agent.

13. Dexanabinol, or a derivative thereof, according to claim 12 in combination with another cancer treating therapeutic agent wherein the other cancer treating therapeutic agent is suitable for inhibition of tumourigenesis, inhibition of cell proliferation, or induction of cytotoxicity.

14. Dexanabinol, or a derivative thereof, according to anyone of claims 6 to 11 wherein the cancer to be treated is premalignant, malignant, metastatic, or multidrug-resistant, and combinations thereof.

15. Dexanabinol, or a derivative thereof, according to claim 14 wherein the cancer is one or more metastatic cancers.

16. A method of treating cancer wherein the method comprises the apoptosis of the cancer, which comprises the administration of a therapeutically effective amount of an agent capable of directly or indirectly having an effect on to the proteins N-methyl-D-aspartate (NMDA), Cyclooxygenase-2 (COX-2), Tumour Necrosis factor alpha (TNF-a), Nuclear factor-kappa B (NFκB), Cyclin-dependent kinases, e.g. CDK2/A and CDK5/p25, Histone acetyltransferase (HAT) and Farnesyltransferase, simultaneously, sequentially or separately wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, mesothelioma, liver cancer, intrahepatic bile duct cancer, oesophageal cancer, pancreatic cancer, stomach cancer, laryngeal cancer, brain cancer, ovarian cancer, testicular cancer, cervical cancer, oral cancer, pharyngeal cancer, renal cancer, thyroid cancer, uterine cancer, urinary bladder cancer, hepatocellular carcinoma, thyroid carcinoma, osteosarcoma, small cell lung cancer, leukaemia, myeloma, gastric carcinoma and metastatic cancers.

17. A method according to claim 16 for the apoptosis of cancer cells wherein the cancer cells are selected from one or more of pancreatic carcinoma, glioblastoma,

gastric carcinoma, oesophageal carcinoma, ovarian carcinoma, renal carcinoma and thyroid carcinoma.

18. A method according to claim 16 wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, and metastatic cancers.

19. A method according to anyone of claim 16 to 18 which comprises the administration of a single therapeutic agent for directly or indirectly having an effect on the proteins N-methyl-D-aspartate (NMDA), Cyclooxygenase-2 (COX-2), Tumour Necrosis factor alpha (TNF-a), Nuclear factor-kappa B (NFκB), Cyclin-dependent kinases, e.g. CDK2/A and CDK5/p25, Histone acetyltransferase (HAT) and Farnesyltransferase, simultaneously, sequentially or separately.

20. A method according to anyone of claim 16 to 19 wherein the method comprises administration of a therapeutically effective amount of dexanabinol, or a derivative thereof, to a patient in need of such a therapy.

21. A method according to claim 20 wherein the method comprises administration of a therapeutically effective amount of dexanabinol, or a derivative thereof, sufficient to inhibit tumourigenesis of a cancer cell.

22. A method according to claim 20 wherein the method comprises administration of a therapeutically effective amount dexanabinol, or a derivative thereof, sufficient to induce cytotoxicity in the cancer cell.

23. A method according to claim 17 wherein the method comprises administration of dexanabinol, or a derivative thereof, wherein the amount administered to a patient is sufficient to achieve a plasma concentration of dexanabinol from 10 to 20 μM.

24. A method according to claim 17 wherein the method comprises administration of an effective amount of dexanabinol, or a derivative thereof, sufficient to achieve a plasma concentration of at least 10 μM of therapeutic agent and is maintained for at least 2 hours in the patient.

25. A method according to claims 14 or 17 wherein the cancer cells are premalignant, malignant, metastatic or multidrug-resistant and combinations thereof.

26. A method according to claim 17 which comprises administration of dexanabinol, or a derivative thereof, in combination with another cancer treating therapeutic agent a derivative thereof, separately, simultaneously or sequentially.

27. A method according to claim 23 in combination with another cancer treating therapeutic agent wherein the other cancer treating therapeutic agent is suitable for inhibition of tumourigenesis, inhibition of cell proliferation, or induction of cytotoxicity.

28. A method according to claim 23 wherein the other therapeutic agent comprises a chemotherapeutic agent, immunotherapeutic agent, gene therapy or radio therapeutic agent.

29. A method of simultaneously, sequentially or separately directly or indirectly having an effect on proteins N-methyl-D-aspartate (NMDA), Cyclooxygenase-2 (COX-2), Tumour Necrosis factor alpha (TNF-a), Nuclear factor-kappa B (NFκB), Cyclin-dependent kinases, e.g. CDK2/A and CDK5/p25, Histone acetyltransferase (HAT) and Farnesyltransferase, which comprises the administration of an effective amount of dexanabinol, or a derivative thereof.

30. A method according to claim 17 wherein the dexanabinol, or a derivative thereof, is administered topically, transdermally, subcutaneously, intravenously, or orally.

31. A method according to claim 27 wherein the dexanabinol, or a derivative thereof, is administered topically.

32. The use of dexanabinol, or a derivative thereof, in the manufacture of a medicament for the apoptosis of cancer in a patient, wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, mesothelioma, liver cancer, intrahepatic bile duct cancer, oesophageal cancer, pancreatic cancer, stomach cancer, laryngeal cancer, brain cancer, ovarian cancer, testicular cancer, cervical cancer, oral cancer, pharyngeal cancer, renal cancer, thyroid cancer, uterine cancer, urinary bladder cancer, hepatocellular carcinoma, thyroid carcinoma, osteosarcoma, small cell lung cancer, leukaemia, myeloma, gastric carcinoma and metastatic cancers.

33. The use according to claim 32 wherein the cancer cells wherein the cancer cells are selected from one or more of pancreatic carcinoma, glioblastoma, gastric carcinoma, oesophageal carcinoma, ovarian carcinoma, renal carcinoma and thyroid carcinoma.

34. The use according to claim 32 wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, and metastatic cancers.

35. The use according to anyone of claims 32 to 34 wherein the amount of dexanabinol, or a derivative thereof, administered to a patient is sufficient to achieve a plasma concentration of dexanabinol from 10 to 20 μM.

36. The use according to claim 29 wherein the amount of dexanabinol, or a derivative thereof, sufficient to achieve a plasma concentration of at least 10 μM of therapeutic agent and is maintained for at least 2 hours in the patient.

37. A pharmaceutical composition comprising dexanabinol, or a derivative thereof, wherein the amount of dexanabinol, or a derivative thereof, present is sufficient to achieve a plasma concentration of dexanabinol from 10 to 20 μM.

38. A pharmaceutical composition comprising dexanabinol, or a derivative thereof, wherein the amount of dexanabinol, or a derivative thereof, sufficient to achieve a plasma concentration of at least 10 μM of dexanabinol and is maintained for at least 2 hours in the patient.

39. A compound, method, composition or the use substantially as hereinbefore described with reference to the accompanying examples.

CLAIMS

What is claimed is:

1. Dexanabinol, or a derivative thereof, for the apoptosis of cancer other than melanoma in a patient, wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, mesothelioma, liver cancer, intrahepatic bile duct cancer, oesophageal cancer, pancreatic cancer, stomach cancer, laryngeal cancer, brain cancer, ovarian cancer, testicular cancer, cervical cancer, oral cancer, pharyngeal cancer, renal cancer, thyroid cancer, uterine cancer, urinary bladder cancer, hepatocellular carcinoma, thyroid carcinoma, osteosarcoma, small cell lung cancer, leukaemia, myeloma, gastric carcinoma and metastatic cancers.

2. Dexanabinol, or a derivative thereof, according to claim 1 for the apoptosis of cancer cells wherein the cancer cells are selected from one or more of pancreatic carcinoma, glioblastoma, gastric carcinoma, oesophageal carcinoma, ovarian carcinoma, renal carcinoma and thyroid carcinoma.

3. Dexanabinol, or a derivative thereof, according to claim 1 wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, and metastatic cancers.

4. Dexanabinol, or a derivative thereof, according to anyone of claims 1 to 3 which comprises a therapeutically effective amount sufficient for apoptosis of a cancer cell.

5. Dexanabinol, or a derivative thereof, according to anyone of claims 1 to 4 which comprises a therapeutically effective amount of dexanabinol, or a derivative thereof, sufficient to inhibit tumourigenesis of a cancer cell.

6. Dexanabinol, or a derivative thereof, according to anyone of claims 1 to 5 in combination with another cancer treating therapeutic agent.

7. Dexanabinol, or a derivative thereof, according to claim 6 in combination with another cancer treating therapeutic agent wherein the other cancer treating therapeutic agent is suitable for inhibition of tumourigenesis, inhibition of cell proliferation, or induction of cytotoxicity.

8. Dexanabinol, or a derivative thereof, according to anyone of claims 1 to 5 wherein the cancer to be treated is premalignant, malignant, metastatic, or multidrug-resistant, and combinations thereof.

9. Dexanabinol, or a derivative thereof, according to claim 8 wherein the cancer is one or more metastatic cancers.

10. The use of dexanabinol, or a derivative thereof, in the manufacture of a medicament for the apoptosis of cancer, other than melanoma, in a patient, wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, mesothelioma, liver cancer, intrahepatic bile duct cancer, oesophageal cancer, pancreatic cancer, stomach cancer, laryngeal cancer, brain cancer, ovarian cancer, testicular cancer, cervical cancer, oral cancer, pharyngeal cancer, renal cancer, thyroid cancer, uterine cancer, urinary bladder cancer, hepatocellular carcinoma, thyroid carcinoma, osteosarcoma, small cell lung cancer, leukaemia, myeloma, gastric carcinoma and metastatic cancers.

11. The use according to claim 10 wherein the cancer cells wherein the cancer cells are selected from one or more of pancreatic carcinoma, glioblastoma, gastric carcinoma, oesophageal carcinoma, ovarian carcinoma, renal carcinoma and thyroid carcinoma.

12. The use according to claim 10 wherein the cancer cells are selected from one or more of primary cancer, breast cancer, colon cancer, prostate cancer, non-small cell lung cancer, glioblastoma, lymphoma, and metastatic cancers.

13. The use according to claim 10 wherein the amount of dexanabinol, or a derivative thereof, is a therapeutically effective amount sufficient to inhibit tumourigenesis of a cancer cell.

14. The use according to claim 10 wherein the method comprises administration of a therapeutically effective amount dexanabinol, or a derivative thereof, sufficient to induce cytotoxicity in the cancer cell.

15. The use according to anyone of claims 10 to 12 wherein the amount of dexanabinol, or a derivative thereof, administered to a patient is sufficient to achieve a plasma concentration of dexanabinol from 10 to 20 μM.

16. The use according to claim 15 wherein the amount of dexanabinol, or a derivative thereof, sufficient to achieve a plasma concentration of at least 10 μM of therapeutic agent and is maintained for at least 2 hours in the patient.

17. The use according to claims 10 or 16 wherein the cancer cells are premalignant, malignant, metastatic or multidrug-resistant and combinations thereof.

18. The use according to claim 17 which comprises administration of dexanabinol, or a derivative thereof, in combination with another cancer treating therapeutic agent, or a derivative thereof, separately, simultaneously or sequentially.

19. The use according to claim 18 in combination with another cancer treating therapeutic agent wherein the other cancer treating therapeutic agent is suitable for inhibition of tumourigenesis, inhibition of cell proliferation, or induction of cytotoxicity.

20. The use according to claim 18 wherein the other therapeutic agent comprises a chemotherapeutic agent, immunotherapeutic agent, gene therapy or radio therapeutic agent.

21. The use according to claim 10 wherein the dexanabinol, or a derivative thereof, is administered topically, transdermally, subcutaneously, intravenously, or orally.

22. The use according to claim 21 wherein the dexanabinol, or a derivative thereof, is administered topically.

23. A pharmaceutical composition comprising dexanabinol, or a derivative thereof, wherein the amount of dexanabinol, or a derivative thereof, present is sufficient to achieve a plasma concentration of dexanabinol from 10 to 20 μM.

24. A pharmaceutical composition comprising dexanabinol, or a derivative thereof, wherein the amount of dexanabinol, or a derivative thereof, sufficient to achieve a plasma concentration of at least 10 μM of dexanabinol and is maintained for at least 2 hours in the patient.