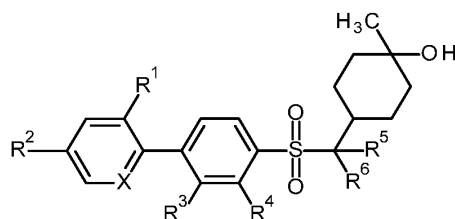


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CLAIMS

1. A compound of the following formula:



5

or a pharmaceutically acceptable salt or solvate thereof;
wherein:

10 =X- is independently -CH= or -N=;

-R¹ is independently -H or -R^{1X};

-R^{1X} is independently -F, -Cl, -R^{1C}, -R^{1F}, or -CN;

-R^{1C} is independently saturated linear or branched C₁₋₃alkyl;

15 -R^{1F} is independently saturated linear or branched C₁₋₃fluoroalkyl;

-R² is independently -H or -R^{2X};

-R^{2X} is independently -F, -Cl, -R^{2C}, -R^{2F}, or -CN;

-R^{2C} is independently saturated linear or branched C₁₋₃alkyl;

20 -R^{2F} is independently saturated linear or branched C₁₋₃fluoroalkyl;

-R³ is independently -H or -R^{3X};

-R^{3X} is independently -F, -Cl, -R^{3C}, -R^{3F}, or -CN;

-R^{3C} is independently saturated linear or branched C₁₋₃alkyl;

25 -R^{3F} is independently saturated linear or branched C₁₋₃fluoroalkyl;

-R⁴ is independently -H or -R^{4X};

-R^{4X} is independently -F, -Cl, -R^{4C}, -R^{4F}, or -CN;

-R^{4C} is independently saturated linear or branched C₁₋₃alkyl;

30 -R^{4F} is independently saturated linear or branched C₁₋₃fluoroalkyl;

-R⁵ is independently -H or -R^{5X};

-R^{5X} is independently -F, -R^{5C}, or -R^{5F};

-R^{5C} is independently saturated linear or branched C₁₋₃alkyl;

35 -R^{5F} is independently saturated linear or branched C₁₋₃fluoroalkyl;

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-R⁶ is independently -H or -R^{6X};
-R^{6X} is independently -F, -R^{6C}, or -R^{6F};
-R^{6C} is independently saturated linear or branched C₁₋₃alkyl; and
-R^{6F} is independently saturated linear or branched C₁₋₃fluoroalkyl;

5

or -R⁵ and -R⁶, taken together with the carbon atom to which they are attached, form saturated C₃₋₆cycloalkyl.

2. A compound according to claim 1, wherein =X- is -CH=.
3. A compound according to claim 1, wherein =X- is -N=.
4. A compound according to any one of claims 1 to 3, wherein -R¹ is -R^{1X}.
5. A compound according to any one of claims 1 to 3, wherein -R¹ is -H.
6. A compound according to any one of claims 1 to 5, wherein -R^{1X}, if present, is independently -F, -Cl, or -CN.
7. A compound according to any one of claims 1 to 5, wherein -R^{1X}, if present, is -F.
8. A compound according to any one of claims 1 to 5, wherein -R^{1X}, if present, is -Cl.
9. A compound according to any one of claims 1 to 5, wherein -R^{1X}, if present, is -CN.
10. A compound according to any one of claims 1 to 5, wherein -R^{1X}, if present, is -R^{1C}.
11. A compound according to any one of claims 1 to 5, wherein -R^{1X}, if present, is -R^{1F}.
12. A compound according to any one of claims 1 to 11, wherein -R^{1C}, if present, is -CH₃.
13. A compound according to any one of claims 1 to 12, wherein -R^{1F}, if present, is -CF₃.
14. A compound according to any one of claims 1 to 13, wherein -R² is -R^{2X}.
15. A compound according to any one of claims 1 to 13, wherein -R² is -H.

16. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is independently -F, -Cl, or -CN.
- 5 17. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is -F.
18. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is -Cl.
- 10 19. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is -CN.
20. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is $-R^{2C}$.
- 15 21. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is $-R^{2F}$.
22. A compound according to any one of claims 1 to 21, wherein $-R^{2C}$, if present, is $-CH_3$.
- 20 23. A compound according to any one of claims 1 to 22, wherein $-R^{2F}$, if present, is $-CF_3$.
- 25 24. A compound according to any one of claims 1 to 23, wherein $-R^3$ is $-R^{3X}$.
25. A compound according to any one of claims 1 to 23, wherein $-R^3$ is -H.
26. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is independently -F, -Cl, or -CN.
- 30 27. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is -F.
28. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is -Cl.
- 35 29. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is -CN.
- 40 30. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is $-R^{3C}$.

31. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is $-R^{3F}$.
- 5 32. A compound according to any one of claims 1 to 31, wherein $-R^{3C}$, if present, is $-CH_3$.
33. A compound according to any one of claims 1 to 32, wherein $-R^{3F}$, if present, is $-CF_3$.
- 10 34. A compound according to any one of claims 1 to 33, wherein $-R^4$ is $-R^{4X}$.
35. A compound according to any one of claims 1 to 33, wherein $-R^4$ is $-H$.
- 15 36. A compound according to any one of claims 1 to 35, wherein $-R^{4X}$, if present, is independently $-F$, $-Cl$, or $-CN$.
37. A compound according to any one of claims 1 to 35, wherein $-R^{4X}$, if present, is $-F$.
- 20 38. A compound according to any one of claims 1 to 35, wherein $-R^{4X}$, if present, is $-Cl$.
39. A compound according to any one of claims 1 to 35, wherein $-R^{4X}$, if present, is $-CN$.
- 25 40. A compound according to any one of claims 1 to 35, wherein $-R^{4X}$, if present, is $-R^{4C}$.
41. A compound according to any one of claims 1 to 35, wherein $-R^{4X}$, if present, is $-R^{4F}$.
- 30 42. A compound according to any one of claims 1 to 41, wherein $-R^{4C}$, if present, is $-CH_3$.
43. A compound according to any one of claims 1 to 42, wherein $-R^{4F}$, if present, is $-CF_3$.
- 35 44. A compound according to any one of claims 1 to 43, wherein $-R^5$ is $-R^{5X}$.
- 40 45. A compound according to any one of claims 1 to 43, wherein $-R^5$ is $-H$.

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46. A compound according to any one of claims 1 to 45, wherein $-R^{5X}$ is independently $-F$, $-R^{5C}$, or $-R^{5F}$.
- 5 47. A compound according to any one of claims 1 to 45, wherein $-R^{5X}$, if present, is $-F$.
48. A compound according to any one of claims 1 to 45, wherein $-R^{5X}$, if present, is $-R^{5C}$.
- 10 49. A compound according to any one of claims 1 to 45, wherein $-R^{5X}$, if present, is $-R^{5F}$.
50. A compound according to any one of claims 1 to 49, wherein $-R^{5C}$, if present, is $-CH_3$.
- 15 51. A compound according to any one of claims 1 to 50, wherein $-R^{5F}$, if present, is $-CF_3$.
52. A compound according to any one of claims 1 to 51, wherein $-R^6$ is $-R^{6X}$.
- 20 53. A compound according to any one of claims 1 to 51, wherein $-R^6$ is $-H$.
54. A compound according to any one of claims 1 to 53, wherein $-R^{6X}$ is independently $-F$, $-R^{6C}$, or $-R^{6F}$.
- 25 55. A compound according to any one of claims 1 to 53, wherein $-R^{6X}$, if present, is $-F$.
56. A compound according to any one of claims 1 to 53, wherein $-R^{6X}$, if present, is $-R^{6C}$.
- 30 57. A compound according to any one of claims 1 to 53, wherein $-R^{6X}$, if present, is $-R^{6F}$.
58. A compound according to any one of claims 1 to 57, wherein $-R^{6C}$, if present, is $-CH_3$.
- 35 59. A compound according to any one of claims 1 to 58, wherein $-R^{6F}$, if present, is $-CF_3$.
- 40 60. A compound according to any one of claims 1 to 43, wherein $-R^5$ and $-R^6$, taken together with the carbon atom to which they are attached, form saturated C_{3-6} cycloalkyl.

61. A compound according to any one of claims 1 to 43, wherein -R⁵ and -R⁶, taken together with the carbon atom to which they are attached, form cyclopropyl.

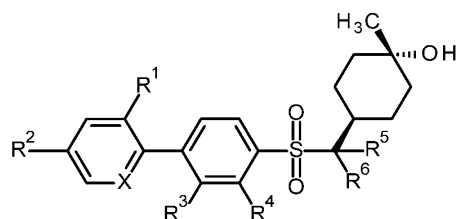
5 62. A compound according to any one of claims 1 to 43, wherein -R⁵ and -R⁶, taken together with the carbon atom to which they are attached, form cyclobutyl.

63. A compound according to any one of claims 1 to 43, wherein -R⁵ and -R⁶, taken together with the carbon atom to which they are attached, form cyclopentyl.

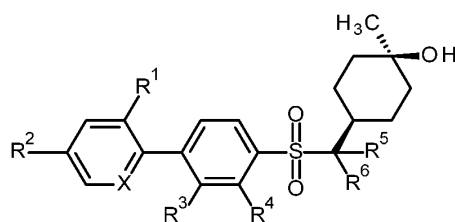
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64. A compound according to any one of claims 1 to 43, wherein -R⁵ and -R⁶, taken together with the carbon atom to which they are attached, form cyclohexyl.

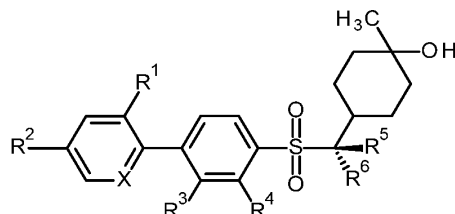
15 65. A compound according to any one of claims 1 to 64, wherein the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:



20 66. A compound according to any one of claims 1 to 64, wherein the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:

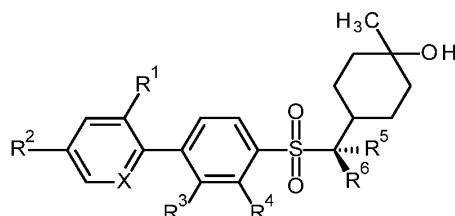


67. A compound according to any one of claims 1 to 66, wherein -R⁵ and -R⁶ are different, and the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:



5

68. A compound according to any one of claims 1 to 66, wherein -R⁵ and -R⁶ are different, and the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:



10

69. A compound according to claim 1, which is a compound of one of following formulae, or a pharmaceutically acceptable salt or solvate thereof:
CHMSA-01, CHMSA-02, CHMSA-03, CHMSA-04, CHMSA-05, CHMSA-06,
CHMSA-07, CHMSA-08, CHMSA-09, CHMSA-10, CHMSA-11, and CHMSA-12.

15

70. A compound according to claim 1, which is a compound of one of following formulae, or a pharmaceutically acceptable salt or solvate thereof:
CHMSA-01-A, CHMSA-02-A, CHMSA-03-A, CHMSA-04-A, CHMSA-05-A,
CHMSA-06-A, CHMSA-07-A, CHMSA-08-A, CHMSA-09-A, CHMSA-10-A,
CHMSA-11-A, and CHMSA-12-A.

20

71. A compound according to claim 1, which is a compound of one of following formulae, or a pharmaceutically acceptable salt or solvate thereof:
CHMSA-01-B, CHMSA-02-B, CHMSA-03-B, CHMSA-04-B, CHMSA-05-B,
CHMSA-06-B, CHMSA-07-B, CHMSA-08-B, CHMSA-09-B, CHMSA-10-B,
CHMSA-11-B, and CHMSA-12-B.

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72. A composition comprising a compound according to any one of claims 1 to 71, and a carrier, diluent, or excipient.
- 5 73. A method of preparing a composition comprising the step of mixing a compound according to any one of claims 1 to 71 and a carrier or diluent.
74. A compound according to any one of claims 1 to 71 for use in a method of treatment of the human or animal body by therapy.
- 10 75. A compound according to any one of claims 1 to 71 for use in a method of treatment of a disorder.
76. Use of a compound according to any one of claims 1 to 71 in the manufacture of a medicament for treatment of a disorder.
- 15 77. A method of treatment of a disorder comprising administering to a patient in need of treatment a therapeutically effective amount of a compound according to any one of claims 1 to 71.
- 20 78. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
a disorder associated with changes in cellular metabolism.
- 25 79. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
an autoimmune/inflammatory disorder; cancer; or a disorder mediated by osteoclasts.
- 30 80. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
multiple myeloma, diffuse large B-cell lymphoma, acute myeloid leukemia, eosinophilic leukemia, glioblastoma, melanoma, ovarian cancer, chemotherapy resistant cancer, radiation resistant cancer, inflammatory arthritis, rheumatoid arthritis, psoriatic arthritis, psoriasis, ulcerative colitis, Crohn's disease, systemic
35 lupus erythematosus (SLE), lupus nephritis, asthma, chronic obstructive pulmonary disease (COPD), autoimmune hepatitis, non-alcoholic fatty liver disease (NAFLD), non-alcoholic steatohepatitis (NASH), or hidradenitis suppurativa.

81. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
an autoimmune/inflammatory disorder.
- 5 82. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
inflammatory arthritis (including, e.g., rheumatoid arthritis; psoriatic arthritis; ankylosing spondylitis; spondyloarthritis; reactive arthritis; infectious arthritis; systemic lupus erythematosus; scleroderma; gout; adult-onset Still's disease; juvenile idiopathic arthritis); psoriasis; systemic lupus erythematosus;
10 lupus nephritis; systemic sclerosis; scleroderma; hepatitis; endometriosis; Sjogren's syndrome; inflammatory bowel disease; ulcerative colitis; Crohn's disease; multiple sclerosis; asthma; atherosclerosis; chronic obstructive pulmonary disease (COPD); hidradenitis suppurativa; uveitis; pulmonary fibrosis;
15 non-alcoholic fatty liver disease (NAFLD); non-alcoholic steatohepatitis (NASH); allergic disease (including, e.g., atopy, allergic rhinitis, atopic dermatitis, anaphylaxis, allergic bronchopulmonary aspergillosis, allergic gastroenteritis, hypersensitivity pneumonitis); an allergy; type I diabetes; rheumatic fever; celiac disease; encephalitis; oophoritis; primary biliary cirrhosis; insulin-resistant
20 diabetes; autoimmune adrenal insufficiency (Addison's disease); autoimmune hepatitis; autoimmune oophoritis; autoimmune orchitis; autoimmune haemolytic anaemia; paroxysmal cold hemoglobinuria; Behçet's disease; autoimmune thrombocytopenia; autoimmune neutropenia; pernicious anaemia; pure red cell anaemia; autoimmune coagulopathy; myasthenia gravis; autoimmune polyneuritis;
25 pemphigus; rheumatic carditis; Goodpasture's syndrome; postcardiotomy syndrome; polymyositis; dermatomyositis; irritable bowel syndrome; pancreatitis; gastritis; lichen planus; delayed type hypersensitivity; chronic pulmonary inflammation; pulmonary alveolitis; pulmonary granuloma; gingival inflammation; endodontic disease; periodontal disease; hypersensitivity pneumonitis; hay fever;
30 anaphylaxis; skin allergy; hives; gout; polycystic kidney disease; cryopyrin-associated periodic syndrome (CAPS); Muckle-Wells Syndrome; Guillain-Barre syndrome; chronic inflammatory demyelinating polyneuropathy; organ or transplant rejection; chronic allograft rejection; acute or chronic graft versus-host disease; dermatitis; atopic dermatomyositis; Graves' disease; autoimmune
35 (Hashimoto's) thyroiditis; blistering disorder; vasculitis syndrome; immune-complex mediated vasculitis; bronchitis; cystic fibrosis; pneumonia; pulmonary oedema; pulmonary embolism; sarcoidosis; hypertension; emphysema; respiratory failure; acute respiratory distress syndrome; BENTA disease; or polymyositis.
40

83. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
inflammatory arthritis (including, e.g., rheumatoid arthritis; psoriatic arthritis; systemic lupus erythematosus; juvenile idiopathic arthritis); psoriasis;
5 lupus nephritis; systemic sclerosis; inflammatory bowel disease; ulcerative colitis; Crohn's disease; or multiple sclerosis.
84. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
10 cancer.
85. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
multiple myeloma; lymphoma; leukaemia; carcinoma; or sarcoma.
15
86. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
Hodgkin's lymphoma; non-Hodgkin's lymphoma; lymphocytic lymphoma;
granulocytic lymphoma; monocytic lymphoma; diffuse large B-cell lymphoma
20 (DLBCL); mantel cell lymphoma (MCL); follicular cell lymphoma (FL); mucosa-associated lymphoid tissue (MALT) lymphoma; marginal zone lymphoma; T-cell lymphoma; marginal zone lymphoma; or Burkitt's lymphoma.
87. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
chronic lymphocytic leukemia (CLL); acute myeloid leukemia (AML); acute
lymphocytic leukemia (ALL); lymphoblastic T-cell leukemia; chronic myelogenous
leukemia (CML); hairy-cell leukemia; acute lymphoblastic T-cell leukemia; acute
eosinophilic leukemia; immunoblastic large-cell leukemia; megakaryoblastic
30 leukemia; acute megakaryocytic leukemia; promyelocytic leukemia; erythroleukemia; or plasmacytoma.
88. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
colon cancer; breast cancer; ovarian cancer; lung cancer (including, e.g.,
35 small cell lung carcinoma and non-small cell lung carcinoma); prostate cancer; cancer of the oral cavity or pharynx (including, e.g., cancer of the lip, tongue, mouth, larynx, pharynx, salivary gland, buccal mucosa); esophageal cancer; stomach cancer; small intestine cancer; large intestine cancer; rectal cancer; liver
40 passage cancer; biliary passage cancer; pancreatic cancer; bone cancer; connective tissue cancer; skin cancer; cervical cancer; uterine cancer; corpus

- cancer; endometrial cancer; vulval cancer; vaginal cancer; testicular cancer; bladder cancer; kidney cancer; ureter cancer; urethral cancer; urachus cancer; eye cancer; glioma; spinal cord cancer; central nervous system cancer; peripheral nervous system cancer; meningeal cancer; thyroid cancer; adrenocarcinoma; astrocytoma; acoustic neuroma; anaplastic astrocytoma; basal cell carcinoma; blastoglioma; choriocarcinoma; chordoma; craniopharyngioma; cutaneous melanoma; cystadenocarcinoma; embryonal carcinoma; ependymoma; epithelial carcinoma; gastric cancer; genitourinary tract cancer; glioblastoma multiforme; head and neck cancer; hemangioblastoma; hepatocellular carcinoma; renal cell carcinoma (RCC); hepatoma; large cell carcinoma; medullary thyroid carcinoma; medulloblastoma; meningioma mesothelioma; myeloma; neuroblastoma; oligodendroglioma; epithelial ovarian cancer; papillary carcinoma; papillary adenocarcinoma; paraganglioma; parathyroid tumour; pheochromocytoma; pinealoma; plasmacytoma; retinoblastoma; sebaceous gland carcinoma; seminoma; melanoma; squamous cell carcinoma; sweat gland carcinoma; synovioma; thyroid cancer; uveal melanoma; or Wilm's tumor.
89. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- colon cancer; breast cancer; ovarian cancer; lung cancer (including, e.g., small cell lung carcinoma and non-small cell lung carcinoma); prostate cancer; stomach cancer; pancreatic cancer; bone cancer; skin cancer; cervical cancer; uterine cancer; endometrial cancer; testicular cancer; bladder cancer; kidney cancer; eye cancer; liver cancer; glioma; thyroid cancer; adrenocarcinoma; astrocytoma; acoustic neuroma; anaplastic astrocytoma; cutaneous melanoma; gastric cancer; glioblastoma multiforme; head and neck cancer; hepatocellular carcinoma; renal cell carcinoma (RCC); melanoma; or squamous cell carcinoma.
90. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- colon cancer; breast cancer; ovarian cancer; lung cancer (including, e.g., small cell lung carcinoma and non-small cell lung carcinoma); prostate cancer; pancreatic cancer; bone cancer; liver cancer; glioblastoma multiforme; head and neck cancer; or melanoma.
91. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- Askin's tumour; sarcoma botryoides; chondrosarcoma; endotheliosarcoma; Ewing's sarcoma; Malignant hemagioendothelioma; malignant Schwannoma; osteosarcoma; gastrointestinal stromal tumour (GIST); myxosarcoma; alveolar soft part sarcoma; angiosarcoma; cystosarcoma phyllodes; dermatofibrosarcoma;

- desmoid tumour; desmoplastic small round cell tumour; extraskkeletal chondrosarcoma; osteosarcoma; fibrosarcoma; hemangiopericytoma; hemangiosarcoma; Kaposi's sarcoma; leiomyosarcoma; liposarcoma; lymphangiosarcoma; lymphangioendotheliosarcoma; lymphosarcoma; malignant peripheral nerve sheath tumour; neurofibrosarcoma; plexiform fibrohistiocytic tumour; rhabdomyosarcoma; or synovial sarcoma.
- 5
92. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- 10 treatment refractory cancer (including, e.g., chemotherapy resistant cancer and radiotherapy resistant cancer); metastatic cancer; metastases; or recurrent cancer.
93. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- 15 a disorder mediated by osteoclasts.
94. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- 20 rheumatoid arthritis; osteoporosis; Paget's disease; osteopetrosis; osteoarthritis; ectopic bone formation; bone loss associated with endometriosis; neoplasia of bones (including, e.g., as a primary tumour or as metastases and including, e.g., bone cancer; osteosarcoma; or osteoma); cancer-associated bone disease (including, e.g., metastatic bone disease associated with, e.g., breast cancer, lung cancer, prostate cancer, or multiple myeloma; changes in bone mineralisation and density associated with cancer, including, e.g., hypercalcaemia associated with cancer); bone metastases (including, e.g., osteolytic bone metastases); hypercalcaemia (including, e.g., hypercalcaemia associated with cancer; hypercalcaemia caused by conditions associated with increased bone resorption (including, e.g., hypercalcaemia caused by vitamin D intoxication, primary or tertiary hyperparathyroidism, immobilisation, or sarcoidosis); or aseptic loosening of prosthetic implants (e.g., artificial joints, e.g., knees, hips, etc.).
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- 30

95. A compound for use according to claim 75, use according to claim 76, or a method according to claim 77, wherein the treatment is treatment of:
- 5 rheumatoid arthritis; osteoporosis; neoplasia of bones (including, e.g., as a primary tumour or as metastases and including, e.g., bone cancer; osteosarcoma; or osteoma); cancer-associated bone disease (including, e.g., metastatic bone disease associated with, e.g., breast cancer, lung cancer, prostate cancer, or multiple myeloma; changes in bone mineralisation and density associated with cancer, including, e.g., hypercalcaemia associated with cancer); or bone
- 10 metastases (including, e.g., osteolytic bone metastases).