

TREATMENT FOR AMYLOIDOSIS

INCORPORATION BY REFERENCE TO ANY PRIORITY APPLICATIONS

[0001] Any and all applications for which a foreign or domestic priority claim is identified, for example, in the Application Data Sheet or Request as filed with the present application, are hereby incorporated by reference under 37 CFR 1.57, and Rules 4.18 and 20.6, including U.S. Provisional Application No. 63/027,194, filed May 19, 2020.

BACKGROUND

Field

[0002] The present application relates to the fields of chemistry, biochemistry and medicine. More particularly, disclosed herein are monotherapies and combination therapies, and methods of treating diseases and/or conditions with the therapies described herein.

Description

[0003] Amyloidosis refers to a group of diseases caused by protein misfolding and aggregation into highly ordered amyloid fibrils that deposit in tissues. Some of the types of amyloidosis include amyloid light-chain (AL) amyloidosis, amyloid type A (AA) amyloidosis, dialysis-related amyloidosis (DRA), familial or hereditary amyloidosis, age-related (senile) systemic amyloidosis, and organ-specific amyloidosis. If left untreated, amyloidosis may result in progressive organ damage. Current amyloidosis treatments include chemotherapy, stem cell transplant therapy, steroid therapy, treatment of the underlying disorder, and combinations thereof. However, there still exists a need for effective amyloidosis treatments.

SUMMARY

[0004] Various embodiments provide a use of an effective amount of a compound of Formula (A), or a pharmaceutically acceptable salt thereof, in the preparation of a medicament for treating amyloidosis, as described in detail below and summarized in the claims. A compound of Formula (A), or a pharmaceutically acceptable salt thereof, for use in treating amyloidosis, as described in detail below and summarized in the claims. A method for treating amyloidosis that includes administering to a subject an effective amount of a compound of Formula (A), or a pharmaceutically acceptable salt thereof, as described in detail below and summarized in the claims. A method for treating amyloidosis that includes contacting a diseased cell with an effective amount of a compound of Formula (A), or a pharmaceutically acceptable salt thereof, as described in detail below and summarized in the claims.

DRAWINGS

[0005] Figure 1 shows the results of a tumor growth study in response to Compound (A) in a OPM-2 mouse model.

[0006] Figure 2 shows the results of a tumor growth study in response to Compound (A) in a KMS-12-BM mouse model.

[0007] Figure 3 shows the results of a tumor growth study in response to monotherapies and a combination therapy with Compound (A) and dexamethasone in a KMS-12-BM mouse model.

[0008] Figure 4 shows the results of a tumor growth study in response to monotherapies and a combination therapy with Compound (A) and bortezomib in a KMS-12-BM mouse model.

DETAILED DESCRIPTION

Definitions

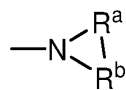
[0009] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by one of ordinary skill

in the art. All patents, applications, published applications and other publications referenced herein are incorporated by reference in their entirety unless stated otherwise. In the event that there are a plurality of definitions for a term herein, those in this section prevail unless stated otherwise.

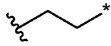
[0010] Whenever a group is described as being "optionally substituted" that group may be unsubstituted or substituted with one or more of the indicated substituents. Likewise, when a group is described as being "unsubstituted or substituted" if substituted, the substituent(s) may be selected from one or more the indicated substituents. If no substituents are indicated, it is meant that the indicated "optionally substituted" or "substituted" group may be substituted with one or more group(s) individually and independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl, heteroaryl, heterocyclyl, aryl(alkyl), cycloalkyl(alkyl), heteroaryl(alkyl), heterocyclyl(alkyl), hydroxy, alkoxy, acyl, cyano, halogen, thiocarbonyl, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, C-amido, N-amido, S-sulfonamido, N-sulfonamido, C-carboxy, O-carboxy, nitro, sulfinyl, sulfonyl, haloalkyl, haloalkoxy, an amino, a mono-substituted amine group, a di-substituted amine group, a mono-substituted amine(alkyl) and a di-substituted amine(alkyl).

[0011] As used herein, "C_a to C_b" in which "a" and "b" are integers refer to the number of carbon atoms in a group. The indicated group can contain from "a" to "b", inclusive, carbon atoms. Thus, for example, a "C₁ to C₄ alkyl" group refers to all alkyl groups having from 1 to 4 carbons, that is, CH₃-, CH₃CH₂-, CH₃CH₂CH₂-, (CH₃)₂CH-, CH₃CH₂CH₂CH₂-, CH₃CH₂CH(CH₃)- and (CH₃)₃C-. If no "a" and "b" are designated, the broadest range described in these definitions is to be assumed.

[0012] If two "R" groups are described as being "taken together" the R groups and the atoms they are attached to can form a cycloalkyl, cycloalkenyl, aryl, heteroaryl or heterocycle. For example, without limitation, if R^a and R^b of an NR^aR^b group are indicated to be "taken together," it means that they are covalently bonded to one another to form a ring:



[0013] As used herein, the term “alkyl” refers to a fully saturated aliphatic hydrocarbon group. The alkyl moiety may be branched or straight chain. Examples of branched alkyl groups include, but are not limited to, iso-propyl, sec-butyl, t-butyl and the like. Examples of straight chain alkyl groups include, but are not limited to, methyl, ethyl, n-propyl, n-butyl, n-pentyl, n-hexyl, n-heptyl and the like. The alkyl group may have 1 to 30 carbon atoms (whenever it appears herein, a numerical range such as “1 to 30” refers to each integer in the given range; *e.g.*, “1 to 30 carbon atoms” means that the alkyl group may consist of 1 carbon atom, 2 carbon atoms, 3 carbon atoms, *etc.*, up to and including 30 carbon atoms, although the present definition also covers the occurrence of the term “alkyl” where no numerical range is designated). The alkyl group may also be a medium size alkyl having 1 to 12 carbon atoms. The alkyl group could also be a lower alkyl having 1 to 6 carbon atoms. An alkyl group may be substituted or unsubstituted.

[0014] As used herein, the term “alkylene” refers to a bivalent fully saturated straight chain aliphatic hydrocarbon group. Examples of alkylene groups include, but are not limited to, methylene, ethylene, propylene, butylene, pentylene, hexylene, heptylene and octylene. An alkylene group may be represented by , followed by the number of carbon atoms, followed by a “*”. For example,  to represent ethylene. The alkylene group may have 1 to 30 carbon atoms (whenever it appears herein, a numerical range such as “1 to 30” refers to each integer in the given range; *e.g.*, “1 to 30 carbon atoms” means that the alkyl group may consist of 1 carbon atom, 2 carbon atoms, 3 carbon atoms, *etc.*, up to and including 30 carbon atoms, although the present definition also covers the occurrence of the term “alkylene” where no numerical range is designated). The alkylene group may also be a medium size alkyl having 1 to 12 carbon atoms. The alkylene group could also be a lower alkyl having 1 to 4 carbon atoms. An alkylene group may be substituted or unsubstituted. For example, a lower alkylene group

can be substituted by replacing one or more hydrogen of the lower alkylene group and/or by substituting both hydrogens on the same carbon with a C₃₋₆ monocyclic

cycloalkyl group (e.g., ).

[0015] The term "alkenyl" used herein refers to a monovalent straight or branched chain radical of from two to twenty carbon atoms containing a carbon double bond(s) including, but not limited to, 1-propenyl, 2-propenyl, 2-methyl-1-propenyl, 1-butenyl, 2-butenyl and the like. An alkenyl group may be unsubstituted or substituted.

[0016] The term "alkynyl" used herein refers to a monovalent straight or branched chain radical of from two to twenty carbon atoms containing a carbon triple bond(s) including, but not limited to, 1-propynyl, 1-butyne, 2-butyne and the like. An alkynyl group may be unsubstituted or substituted.

[0017] As used herein, "cycloalkyl" refers to a completely saturated (no double or triple bonds) mono- or multi- cyclic (such as bicyclic) hydrocarbon ring system. When composed of two or more rings, the rings may be joined together in a fused, bridged or spiro fashion. As used herein, the term "fused" refers to two rings which have two atoms and one bond in common. As used herein, the term "bridged cycloalkyl" refers to compounds wherein the cycloalkyl contains a linkage of one or more atoms connecting non-adjacent atoms. As used herein, the term "spiro" refers to two rings which have one atom in common and the two rings are not linked by a bridge. Cycloalkyl groups can contain 3 to 30 atoms in the ring(s), 3 to 20 atoms in the ring(s), 3 to 10 atoms in the ring(s), 3 to 8 atoms in the ring(s) or 3 to 6 atoms in the ring(s). A cycloalkyl group may be unsubstituted or substituted. Examples of mono-cycloalkyl groups include, but are in no way limited to, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl and cyclooctyl. Examples of fused cycloalkyl groups are decahydronaphthalenyl, dodecahydro-1H-phenalenyl and tetradecahydroanthracenyl; examples of bridged cycloalkyl groups are bicyclo[1.1.1]pentyl, adamantanyl and norbornanyl; and examples of spiro cycloalkyl groups include spiro[3.3]heptane and spiro[4.5]decane.

[0018] As used herein, "cycloalkenyl" refers to a mono- or multi- cyclic (such as bicyclic) hydrocarbon ring system that contains one or more double bonds in at least one ring; although, if there is more than one, the double bonds cannot form a fully delocalized pi-electron system throughout all the rings (otherwise the group would be "aryl," as defined herein). Cycloalkenyl groups can contain 3 to 10 atoms in the ring(s), 3 to 8 atoms in the ring(s) or 3 to 6 atoms in the ring(s). When composed of two or more rings, the rings may be connected together in a fused, bridged or spiro fashion. A cycloalkenyl group may be unsubstituted or substituted.

[0019] As used herein, "aryl" refers to a carbocyclic (all carbon) monocyclic or multicyclic (such as bicyclic) aromatic ring system (including fused ring systems where two carbocyclic rings share a chemical bond) that has a fully delocalized pi-electron system throughout all the rings. The number of carbon atoms in an aryl group can vary. For example, the aryl group can be a C₆-C₁₄ aryl group, a C₆-C₁₀ aryl group or a C₆ aryl group. Examples of aryl groups include, but are not limited to, benzene, naphthalene and azulene. An aryl group may be substituted or unsubstituted.

[0020] As used herein, "heteroaryl" refers to a monocyclic or multicyclic (such as bicyclic) aromatic ring system (a ring system with fully delocalized pi-electron system) that contain(s) one or more heteroatoms (for example, 1, 2 or 3 heteroatoms), that is, an element other than carbon, including but not limited to, nitrogen, oxygen and sulfur. The number of atoms in the ring(s) of a heteroaryl group can vary. For example, the heteroaryl group can contain 4 to 14 atoms in the ring(s), 5 to 10 atoms in the ring(s) or 5 to 6 atoms in the ring(s), such as nine carbon atoms and one heteroatom; eight carbon atoms and two heteroatoms; seven carbon atoms and three heteroatoms; eight carbon atoms and one heteroatom; seven carbon atoms and two heteroatoms; six carbon atoms and three heteroatoms; five carbon atoms and four heteroatoms; five carbon atoms and one heteroatom; four carbon atoms and two heteroatoms; three carbon atoms and three heteroatoms; four carbon atoms and one heteroatom; three carbon atoms and two heteroatoms; or two carbon atoms and three heteroatoms. Furthermore, the term

"heteroaryl" includes fused ring systems where two rings, such as at least one aryl ring and at least one heteroaryl ring or at least two heteroaryl rings, share at least one chemical bond. Examples of heteroaryl rings include, but are not limited to, furan, furazan, thiophene, benzothiophene, phthalazine, pyrrole, oxazole, benzoxazole, 1,2,3-oxadiazole, 1,2,4-oxadiazole, thiazole, 1,2,3-thiadiazole, 1,2,4-thiadiazole, benzothiazole, imidazole, benzimidazole, indole, indazole, pyrazole, benzopyrazole, isoxazole, benzoisoxazole, isothiazole, triazole, benzotriazole, thiadiazole, tetrazole, pyridine, pyridazine, pyrimidine, pyrazine, purine, pteridine, quinoline, isoquinoline, quinazoline, quinoxaline, cinnoline and triazine. A heteroaryl group may be substituted or unsubstituted.

[0021] As used herein, "heterocyclyl" or "heteroalicyclyl" refers to three-, four-, five-, six-, seven-, eight-, nine-, ten-, up to 18-membered monocyclic, bicyclic and tricyclic ring system wherein carbon atoms together with from 1 to 5 heteroatoms constitute said ring system. A heterocycle may optionally contain one or more unsaturated bonds situated in such a way, however, that a fully delocalized pi-electron system does not occur throughout all the rings. The heteroatom(s) is an element other than carbon including, but not limited to, oxygen, sulfur and nitrogen. A heterocycle may further contain one or more carbonyl or thiocarbonyl functionalities, so as to make the definition include oxo-systems and thio-systems such as lactams, lactones, cyclic imides, cyclic thioimides and cyclic carbamates. When composed of two or more rings, the rings may be joined together in a fused, bridged or spiro fashion. As used herein, the term "fused" refers to two rings which have two atoms and one bond in common. As used herein, the term "bridged heterocyclyl" or "bridged heteroalicyclyl" refers to compounds wherein the heterocyclyl or heteroalicyclyl contains a linkage of one or more atoms connecting non-adjacent atoms. As used herein, the term "spiro" refers to two rings which have one atom in common and the two rings are not linked by a bridge. Heterocyclyl and heteroalicyclyl groups can contain 3 to 30 atoms in the ring(s), 3 to 20 atoms in the ring(s), 3 to 10 atoms in the ring(s), 3 to 8 atoms in the ring(s) or 3 to 6 atoms in the ring(s). For example, five carbon atoms and one heteroatom; four carbon atoms

and two heteroatoms; three carbon atoms and three heteroatoms; four carbon atoms and one heteroatom; three carbon atoms and two heteroatoms; two carbon atoms and three heteroatoms; one carbon atom and four heteroatoms; three carbon atoms and one heteroatom; or two carbon atoms and one heteroatom. Additionally, any nitrogens in a heteroalicyclic may be quaternized. Heterocyclyl or heteroalicyclic groups may be unsubstituted or substituted. Examples of such "heterocyclyl" or "heteroalicyclic" groups include but are not limited to, 1,3-dioxin, 1,3-dioxane, 1,4-dioxane, 1,2-dioxolane, 1,3-dioxolane, 1,4-dioxolane, 1,3-oxathiane, 1,4-oxathiin, 1,3-oxathiolane, 1,3-dithiole, 1,3-dithiolane, 1,4-oxathiane, tetrahydro-1,4-thiazine, 2H-1,2-oxazine, maleimide, succinimide, barbituric acid, thiobarbituric acid, dioxopiperazine, hydantoin, dihydrouracil, trioxane, hexahydro-1,3,5-triazine, imidazoline, imidazolidine, isoxazoline, isoxazolidine, oxazoline, oxazolidine, oxazolidinone, thiazoline, thiazolidine, morpholine, oxirane, piperidine N-Oxide, piperidine, piperazine, pyrrolidine, azepane, pyrrolidone, pyrrolidione, 4-piperidone, pyrazoline, pyrazolidine, 2-oxopyrrolidine, tetrahydropyran, 4H-pyran, tetrahydrothiopyran, thiamorpholine, thiamorpholine sulfoxide, thiamorpholine sulfone and their benzo-fused analogs (e.g., benzimidazolidinone, tetrahydroquinoline and/or 3,4-methylenedioxyphenyl). Examples of spiro heterocyclyl groups include 2-azaspiro[3.3]heptane, 2-oxaspiro[3.3]heptane, 2-oxa-6-azaspiro[3.3]heptane, 2,6-diazaspiro[3.3]heptane, 2-oxaspiro[3.4]octane and 2-azaspiro[3.4]octane.

[0022] As used herein, "aralkyl" and "aryl(alkyl)" refer to an aryl group connected, as a substituent, via a lower alkylene group. The lower alkylene and aryl group of an aralkyl may be substituted or unsubstituted. Examples include but are not limited to benzyl, 2-phenylalkyl, 3-phenylalkyl and naphthylalkyl.

[0023] As used herein, "heteroaralkyl" and "heteroaryl(alkyl)" refer to a heteroaryl group connected, as a substituent, via a lower alkylene group. The lower alkylene and heteroaryl group of heteroaralkyl may be substituted or unsubstituted. Examples include but are not limited to 2-thienylalkyl, 3-thienylalkyl, furylalkyl,

thienylalkyl, pyrrolylalkyl, pyridylalkyl, isoxazolylalkyl and imidazolylalkyl and their benzo-fused analogs.

[0024] A "heteroalicycyl(alkyl)" and "heterocycyl(alkyl)" refer to a heterocyclic or a heteroalicyclic group connected, as a substituent, via a lower alkylene group. The lower alkylene and heterocycyl of a (heteroalicycyl)alkyl may be substituted or unsubstituted. Examples include but are not limited tetrahydro-2H-pyran-4-yl(methyl), piperidin-4-yl(ethyl), piperidin-4-yl(propyl), tetrahydro-2H-thiopyran-4-yl(methyl) and 1,3-thiazinan-4-yl(methyl).

[0025] As used herein, the term "hydroxy" refers to a -OH group.

[0026] As used herein, "alkoxy" refers to the Formula -OR wherein R is an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocycyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocycyl(alkyl) is defined herein. A non-limiting list of alkoxys are methoxy, ethoxy, n-propoxy, 1-methylethoxy (isopropoxy), n-butoxy, iso-butoxy, sec-butoxy, tert-butoxy, phenoxy and benzoxy. An alkoxy may be substituted or unsubstituted.

[0027] As used herein, "acyl" refers to a hydrogen, alkyl, alkenyl, alkynyl, aryl, heteroaryl, heterocycyl, aryl(alkyl), heteroaryl(alkyl) and heterocycyl(alkyl) connected, as substituents, via a carbonyl group. Examples include formyl, acetyl, propanoyl, benzoyl and acryl. An acyl may be substituted or unsubstituted.

[0028] A "cyano" group refers to a "-CN" group.

[0029] The term "halogen atom" or "halogen" as used herein, means any one of the radio-stable atoms of column 7 of the Periodic Table of the Elements, such as, fluorine, chlorine, bromine and iodine.

[0030] A "thiocarbonyl" group refers to a "-C(=S)R" group in which R can be the same as defined with respect to O-carboxy. A thiocarbonyl may be substituted or unsubstituted.

[0031] An "O-carbamyl" group refers to a "-OC(=O)N(R_AR_B)" group in which R_A and R_B can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocycyl, cycloalkyl(alkyl), aryl(alkyl),

heteroaryl(alkyl) or heterocyclyl(alkyl). An O-carbamyl may be substituted or unsubstituted.

[0032] An "N-carbamyl" group refers to an "ROC(=O)N(R_A)-" group in which R and R_A can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). An N-carbamyl may be substituted or unsubstituted.

[0033] An "O-thiocarbamyl" group refers to a "-OC(=S)-N(R_AR_B)" group in which R_A and R_B can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). An O-thiocarbamyl may be substituted or unsubstituted.

[0034] An "N-thiocarbamyl" group refers to an "ROC(=S)N(R_A)-" group in which R and R_A can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). An N-thiocarbamyl may be substituted or unsubstituted.

[0035] A "C-amido" group refers to a "-C(=O)N(R_AR_B)" group in which R_A and R_B can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). A C-amido may be substituted or unsubstituted.

[0036] An "N-amido" group refers to a "RC(=O)N(R_A)-" group in which R and R_A can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). An N-amido may be substituted or unsubstituted.

[0037] An "S-sulfonamido" group refers to a "-SO₂N(R_AR_B)" group in which R_A and R_B can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl),

heteroaryl(alkyl) or heterocyclyl(alkyl). An S-sulfonamido may be substituted or unsubstituted.

[0038] An "N-sulfonamido" group refers to a " $\text{RSO}_2\text{N(R}_A\text{)-}$ " group in which R and R_A can be independently hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). An N-sulfonamido may be substituted or unsubstituted.

[0039] An "O-carboxy" group refers to a " RC(=O)O- " group in which R can be hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl), as defined herein. An O-carboxy may be substituted or unsubstituted.

[0040] The terms "ester" and "C-carboxy" refer to a " -C(=O)OR " group in which R can be the same as defined with respect to O-carboxy. An ester and C-carboxy may be substituted or unsubstituted.

[0041] A "nitro" group refers to an " -NO_2 " group.

[0042] A "sulfenyl" group refers to an " -SR " group in which R can be hydrogen, an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl). A sulfenyl may be substituted or unsubstituted.

[0043] A "sulfinyl" group refers to an " -S(=O)-R " group in which R can be the same as defined with respect to sulfenyl. A sulfinyl may be substituted or unsubstituted.

[0044] A "sulfonyl" group refers to an " SO_2R " group in which R can be the same as defined with respect to sulfenyl. A sulfonyl may be substituted or unsubstituted.

[0045] As used herein, "haloalkyl" refers to an alkyl group in which one or more of the hydrogen atoms are replaced by a halogen (e.g., mono-haloalkyl, di-haloalkyl, tri-haloalkyl and polyhaloalkyl). Such groups include but are not limited to, chloromethyl, fluoromethyl, difluoromethyl, trifluoromethyl, 1-chloro-2-fluoromethyl,

2-fluoroisobutyl and pentafluoroethyl. A haloalkyl may be substituted or unsubstituted.

[0046] As used herein, "haloalkoxy" refers to an alkoxy group in which one or more of the hydrogen atoms are replaced by a halogen (e.g., mono-haloalkoxy, di- haloalkoxy and tri- haloalkoxy). Such groups include but are not limited to, chloromethoxy, fluoromethoxy, difluoromethoxy, trifluoromethoxy, 1-chloro-2-fluoromethoxy and 2-fluoroisobutoxy. A haloalkoxy may be substituted or unsubstituted.

[0047] The terms "amino" and "unsubstituted amino" as used herein refer to a -NH_2 group.

[0048] A "mono-substituted amine" group refers to a " -NHR_A " group in which R_A can be an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl), as defined herein. The R_A may be substituted or unsubstituted. A mono-substituted amine group can include, for example, a mono-alkylamine group, a mono- $\text{C}_1\text{-C}_6$ alkylamine group, a mono-arylamine group, a mono- $\text{C}_6\text{-C}_{10}$ arylamine group and the like. Examples of mono-substituted amine groups include, but are not limited to, -NH(methyl) , -NH(phenyl) and the like.

[0049] A "di-substituted amine" group refers to a " $\text{-NR}_A\text{R}_B$ " group in which R_A and R_B can be independently an alkyl, an alkenyl, an alkynyl, a cycloalkyl, a cycloalkenyl, aryl, heteroaryl, heterocyclyl, cycloalkyl(alkyl), aryl(alkyl), heteroaryl(alkyl) or heterocyclyl(alkyl), as defined herein. R_A and R_B can independently be substituted or unsubstituted. A di-substituted amine group can include, for example, a di-alkylamine group, a di- $\text{C}_1\text{-C}_6$ alkylamine group, a di-arylamine group, a di- $\text{C}_6\text{-C}_{10}$ arylamine group and the like. Examples of di-substituted amine groups include, but are not limited to, -N(methyl)_2 , $\text{-N(phenyl)(methyl)}$, -N(ethyl)(methyl) and the like.

[0050] As used herein, "mono-substituted amine(alkyl)" group refers to a mono-substituted amine as provided herein connected, as a substituent, via a lower

alkylene group. A mono-substituted amine(alkyl) may be substituted or unsubstituted. A mono-substituted amine(alkyl) group can include, for example, a mono-alkylamine(alkyl) group, a mono-C₁-C₆ alkylamine(C₁-C₆ alkyl) group, a mono-arylamine(alkyl group), a mono-C₆-C₁₀ arylamine(C₁-C₆ alkyl) group and the like. Examples of mono-substituted amine(alkyl) groups include, but are not limited to, -CH₂NH(methyl), -CH₂NH(phenyl), -CH₂CH₂NH(methyl), -CH₂CH₂NH(phenyl) and the like.

[0051] As used herein, "di-substituted amine(alkyl)" group refers to a di-substituted amine as provided herein connected, as a substituent, via a lower alkylene group. A di-substituted amine(alkyl) may be substituted or unsubstituted. A di-substituted amine(alkyl) group can include, for example, a dialkylamine(alkyl) group, a di-C₁-C₆ alkylamine(C₁-C₆ alkyl) group, a di-arylamine(alkyl) group, a di-C₆-C₁₀ arylamine(C₁-C₆ alkyl) group and the like. Examples of di-substituted amine(alkyl) groups include, but are not limited to, -CH₂N(methyl)₂, -CH₂N(phenyl)(methyl), -NCH₂(ethyl)(methyl), -CH₂CH₂N(methyl)₂, -CH₂CH₂N(phenyl)(methyl), -NCH₂CH₂(ethyl)(methyl) and the like.

[0052] Where the number of substituents is not specified (e.g. haloalkyl), there may be one or more substituents present. For example, "haloalkyl" may include one or more of the same or different halogens. As another example, "C₁-C₃ alkoxyphenyl" may include one or more of the same or different alkoxy groups containing one, two or three atoms.

[0053] As used herein, a radical indicates species with a single, unpaired electron such that the species containing the radical can be covalently bonded to another species. Hence, in this context, a radical is not necessarily a free radical. Rather, a radical indicates a specific portion of a larger molecule. The term "radical" can be used interchangeably with the term "group."

[0054] The term "pharmaceutically acceptable salt" refers to a salt of a compound that does not cause significant irritation to an organism to which it is administered and does not abrogate the biological activity and properties of the compound. In some embodiments, the salt is an acid addition salt of the compound.

Pharmaceutical salts can be obtained by reacting a compound with inorganic acids such as hydrohalic acid (e.g., hydrochloric acid or hydrobromic acid), a sulfuric acid, a nitric acid and a phosphoric acid (such as 2,3-dihydroxypropyl dihydrogen phosphate). Pharmaceutical salts can also be obtained by reacting a compound with an organic acid such as aliphatic or aromatic carboxylic or sulfonic acids, for example formic, acetic, succinic, lactic, malic, tartaric, citric, ascorbic, nicotinic, methanesulfonic, ethanesulfonic, p-toluenesulfonic, trifluoroacetic, benzoic, salicylic, 2-oxopentanedioic or naphthalenesulfonic acid. Pharmaceutical salts can also be obtained by reacting a compound with a base to form a salt such as an ammonium salt, an alkali metal salt, such as a sodium, a potassium or a lithium salt, an alkaline earth metal salt, such as a calcium or a magnesium salt, a salt of a carbonate, a salt of a bicarbonate, a salt of organic bases such as dicyclohexylamine, N-methyl-D-glucamine, tris(hydroxymethyl)methylamine, C₁-C₇ alkylamine, cyclohexylamine, triethanolamine, ethylenediamine and salts with amino acids such as arginine and lysine. Those skilled in the art understand that when a salt is formed by protonation of a nitrogen-based group (for example, NH₂), the nitrogen-based group can be associated with a positive charge (for example, NH₂ can become NH₃⁺) and the positive charge can be balanced by a negatively charged counterion (such as Cl⁻).

[0055] It is understood that, in any compound described herein having one or more chiral centers, if an absolute stereochemistry is not expressly indicated, then each center may independently be of R-configuration or S-configuration or a mixture thereof. Thus, the compounds provided herein may be enantiomerically pure, enantiomerically enriched, racemic mixture, diastereomerically pure, diastereomerically enriched or a stereoisomeric mixture. In addition, it is understood that, in any compound described herein having one or more double bond(s) generating geometrical isomers that can be defined as E or Z, each double bond may independently be E or Z a mixture thereof. Likewise, it is understood that, in any compound described, all tautomeric forms are also intended to be included.

[0056] It is to be understood that where compounds disclosed herein have unfilled valencies, then the valencies are to be filled with hydrogens or isotopes thereof, e.g., hydrogen-1 (protium) and hydrogen-2 (deuterium).

[0057] It is understood that the compounds described herein can be labeled isotopically. Substitution with isotopes such as deuterium may afford certain therapeutic advantages resulting from greater metabolic stability, such as, for example, increased *in vivo* half-life or reduced dosage requirements. Each chemical element as represented in a compound structure may include any isotope of said element. For example, in a compound structure a hydrogen atom may be explicitly disclosed or understood to be present in the compound. At any position of the compound that a hydrogen atom may be present, the hydrogen atom can be any isotope of hydrogen, including but not limited to hydrogen-1 (protium) and hydrogen-2 (deuterium). Thus, reference herein to a compound encompasses all potential isotopic forms unless the context clearly dictates otherwise.

[0058] It is understood that the methods and combinations described herein include crystalline forms (also known as polymorphs, which include the different crystal packing arrangements of the same elemental composition of a compound), amorphous phases, salts, solvates and hydrates. In some embodiments, the compounds described herein exist in solvated forms with pharmaceutically acceptable solvents such as water, ethanol or the like. In other embodiments, the compounds described herein exist in unsolvated form. Solvates contain either stoichiometric or non-stoichiometric amounts of a solvent, and may be formed during the process of crystallization with pharmaceutically acceptable solvents such as water, ethanol or the like. Hydrates are formed when the solvent is water or alcoholates are formed when the solvent is alcohol. In addition, the compounds provided herein can exist in unsolvated as well as solvated forms. In general, the solvated forms are considered equivalent to the unsolvated forms for the purposes of the compounds and methods provided herein.

[0059] Where a range of values is provided, it is understood that the upper and lower limit, and each intervening value between the upper and lower limit of the range is encompassed within the embodiments.

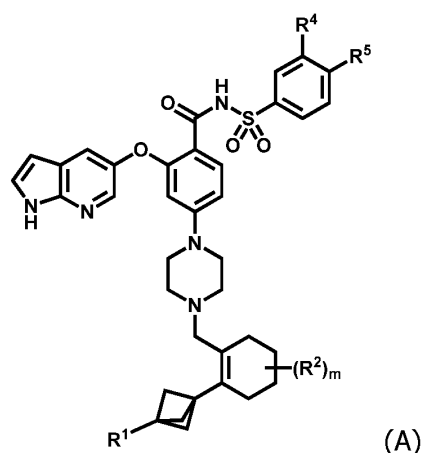
[0060] Terms and phrases used in this application, and variations thereof, especially in the appended claims, unless otherwise expressly stated, should be construed as open ended as opposed to limiting. As examples of the foregoing, the term 'including' should be read to mean 'including, without limitation,' 'including but not limited to,' or the like; the term 'comprising' as used herein is synonymous with 'including,' 'containing,' or 'characterized by,' and is inclusive or open-ended and does not exclude additional, unrecited elements or method steps; the term 'having' should be interpreted as 'having at least;' the term 'includes' should be interpreted as 'includes but is not limited to;' the term 'example' is used to provide exemplary instances of the item in discussion, not an exhaustive or limiting list thereof; and use of terms like 'preferably,' 'preferred,' 'desired,' or 'desirable,' and words of similar meaning should not be understood as implying that certain features are critical, essential, or even important to the structure or function, but instead as merely intended to highlight alternative or additional features that may or may not be utilized in a particular embodiment. In addition, the term "comprising" is to be interpreted synonymously with the phrases "having at least" or "including at least". When used in the context of a compound, composition or device, the term "comprising" means that the compound, composition or device includes at least the recited features or components, but may also include additional features or components.

[0061] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity. The indefinite article "a" or "an" does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be

used to advantage. Any reference signs in the claims should not be construed as limiting the scope.

Compounds

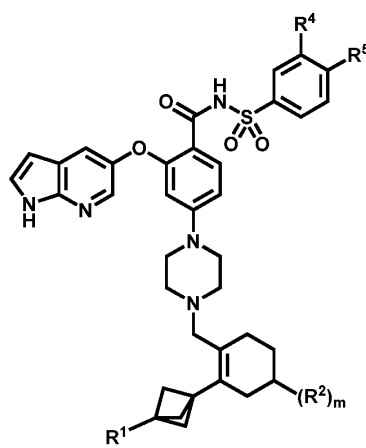
[0062] Some embodiments disclosed herein relate to the use of an effective amount of a compound of Formula (A), or a pharmaceutically acceptable salt thereof, for treating amyloidosis, wherein Formula (A) has the structure:



wherein: R¹ can be selected from hydrogen, halogen, a substituted or unsubstituted C₁-C₆ alkyl, a substituted or unsubstituted C₁-C₆ haloalkyl, a substituted or unsubstituted C₃-C₆ cycloalkyl, a substituted or unsubstituted C₁-C₆ alkoxy, an unsubstituted mono-C₁-C₆ alkylamine and an unsubstituted di-C₁-C₆ alkylamine; each R² can be independently selected from halogen, a substituted or unsubstituted C₁-C₆ alkyl, a substituted or unsubstituted C₁-C₆ haloalkyl and a substituted or unsubstituted C₃-C₆ cycloalkyl; or when m is 2 or 3, each R² can be independently selected from halogen, a substituted or unsubstituted C₁-C₆ alkyl, a substituted or unsubstituted C₁-C₆ haloalkyl and a substituted or unsubstituted C₃-C₆ cycloalkyl, or two R² groups can be taken together with the atom(s) to which they are attached form a substituted or unsubstituted C₃-C₆ cycloalkyl or a substituted or unsubstituted 3 to 6 membered heterocyclyl; R⁴ can be selected from NO₂, S(O)R⁶, SO₂R⁶, halogen, cyano and an unsubstituted C₁-C₆ haloalkyl; R⁵ can be -X¹-(Alk¹)_n-R⁷; Alk¹ can be selected from an unsubstituted C₁-C₄ alkylene and a C₁-C₄ alkylene

substituted with 1, 2 or 3 substituents independently selected from fluoro, chloro, an unsubstituted C₁-C₃ alkyl and an unsubstituted C₁-C₃ haloalkyl; R⁶ can be selected from a substituted or unsubstituted C₁-C₆ alkyl, a substituted or unsubstituted C₁-C₆ haloalkyl and a substituted or unsubstituted C₃-C₆ cycloalkyl; R⁷ can be selected from a substituted or unsubstituted C₁-C₆ alkoxy, a substituted or unsubstituted C₃-C₁₀ cycloalkyl, a substituted or unsubstituted 3 to 10 membered heterocycl, hydroxy, amino, a substituted or unsubstituted mono-substituted amine group, a substituted or unsubstituted di-substituted amine group, a substituted or unsubstituted N-carbamyl, a substituted or unsubstituted C-amido and a substituted or unsubstituted N-amido; m can be 0, 1, 2 or 3; n can be selected from 0 and 1; and X¹ can be selected from -O-, -S- and -NH-.

[0063] In some embodiments, the compound of Formula (A) or a pharmaceutically acceptable salt thereof, can be a compound of the structure:



or a pharmaceutically acceptable salt thereof. In some embodiments, m is 2.

[0064] In some embodiments, R¹ can be halogen, for example, fluoro, chloro, bromo or iodo. In some embodiments, R¹ can be fluoro. In some embodiments, R¹ can be chloro. In some embodiments, R¹ can be hydrogen.

[0065] In some embodiments, R¹ can be a substituted or unsubstituted C₁-C₆ alkyl. For example, in some embodiments, R¹ can be a substituted C₁-C₆ alkyl. In other embodiments, R¹ can be an unsubstituted C₁-C₆ alkyl. Examples of suitable C₁-C₆ alkyl groups include, but are not limited to methyl, ethyl, n-propyl, isopropyl, n-

butyl, isobutyl, tert-butyl, pentyl (branched and straight-chained) and hexyl (branched and straight-chained). In some embodiments, R^1 can be an unsubstituted methyl or an unsubstituted ethyl.

[0066] In some embodiments, R^1 can be a substituted or unsubstituted C_1 - C_6 haloalkyl, for example, a substituted or unsubstituted mono-halo C_1 - C_6 alkyl, a substituted or unsubstituted di-halo C_1 - C_6 alkyl, a substituted or unsubstituted tri-halo C_1 - C_6 alkyl, a substituted or unsubstituted tetra-halo C_1 - C_6 alkyl or a substituted or unsubstituted penta-halo C_1 - C_6 alkyl. In some embodiments, R^1 can be an unsubstituted C_1 - C_6 haloalkyl, for example, $-\text{CHF}_2$, $-\text{CF}_3$, $-\text{CH}_2\text{CF}_3$ or $-\text{CF}_2\text{CH}_3$.

[0067] In some embodiments, R^1 can be a substituted or unsubstituted monocyclic or bicyclic C_3 - C_6 cycloalkyl. For example, in some embodiments, R^1 can be a substituted monocyclic C_3 - C_6 cycloalkyl. In other embodiments, R^1 can be an unsubstituted monocyclic C_3 - C_6 cycloalkyl. Examples of suitable monocyclic or bicyclic C_3 - C_6 cycloalkyl groups include, but are not limited to cyclopropyl, cyclobutyl, cyclopentyl, [1.1.1]bicyclopentyl and cyclohexyl.

[0068] In some embodiments, R^1 can be a substituted or unsubstituted C_1 - C_6 alkoxy. For example, in some embodiments, R^1 can be a substituted C_1 - C_6 alkoxy. In other embodiments, R^1 can be an unsubstituted C_1 - C_6 alkoxy. Examples of suitable C_1 - C_6 alkoxy groups include, but are not limited to methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, tert-butoxy, pentoxy (branched and straight-chained) and hexoxy (branched and straight-chained). In some embodiments, R^1 can be an unsubstituted methoxy or an unsubstituted ethoxy.

[0069] In some embodiments, R^1 can be an unsubstituted mono- C_1 - C_6 alkylamine, for example, methylamine, ethylamine, n-propylamine, isopropylamine, n-butylamine, isobutylamine, tert-butylamine, pentylamine (branched and straight-chained) and hexylamine (branched and straight-chained). In some embodiments, R^1 can be methylamine or ethylamine.

[0070] In some embodiments, R^1 can be an unsubstituted di- C_1 - C_6 alkylamine. In some embodiments, each C_1 - C_6 alkyl in the di- C_1 - C_6 alkylamine is the same. In other embodiments, each C_1 - C_6 alkyl in the di- C_1 - C_6 alkylamine is different.

Examples of suitable di-C₁-C₆ alkylamine groups include, but are not limited to di-methylamine, di-ethylamine, (methyl)(ethyl)amine, (methyl)(isopropyl)amine and (ethyl)(isopropyl)amine.

[0071] In some embodiments, m can be 0. When m is 0, those skilled in the art understand that the ring to which R² is attached is unsubstituted. In some embodiments, m can be 1. In some embodiments, m can be 2. In some embodiments, m can be 3.

[0072] In some embodiments, one R² can be an unsubstituted C₁-C₆ alkyl (for example, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, pentyl (branched and straight-chained) and hexyl (branched and straight-chained)) and any other R², if present, can be independently selected from halogen (for example, fluoro or chloro), a substituted or unsubstituted C₁-C₆ alkyl (such as those described herein), a substituted or unsubstituted C₁-C₆ haloalkyl (such as those described herein) and a substituted or unsubstituted monocyclic or bicyclic C₃-C₆ cycloalkyl (such as those described herein). In some embodiments, each R² can be independently selected from an unsubstituted C₁-C₆ alkyl, such as those described herein.

[0073] In some embodiments, m can be 2; and each R² can be geminal. In some embodiments, m can be 2; and each R² can be vicinal. In some embodiments, m can be 2; and each R² can be an unsubstituted methyl. In some embodiments, m can be 2; and each R² can be a geminal unsubstituted methyl.

[0074] In some embodiments, two R² groups can be taken together with the atom(s) to which they are attached to form a substituted or unsubstituted monocyclic C₃-C₆ cycloalkyl. For example, in some embodiments, two R² groups can be taken together with the atom(s) to which they are attached to form a substituted monocyclic C₃-C₆ cycloalkyl, such as those described herein. In other embodiments, two R² groups can be taken together with the atom(s) to which they are attached to form an unsubstituted monocyclic C₃-C₆ cycloalkyl, such as those described herein. In some embodiments, two R² groups can be taken together with the atom to which they are attached to form an unsubstituted cyclopropyl.

[0075] In some embodiments, two R^2 groups can be taken together with the atom(s) to which they are attached to form a substituted or unsubstituted monocyclic 3 to 6 membered heterocyclyl. For example, in some embodiments, two R^2 groups can be taken together with the atom(s) to which they are attached to form a substituted monocyclic 3 to 6 membered heterocyclyl. In other embodiments, two R^2 groups can be taken together with the atom(s) to which they are attached to form an unsubstituted monocyclic 3 to 6 membered monocyclic heterocyclyl. In some embodiments, the substituted monocyclic 3 to 6 membered heterocyclyl can be substituted on one or more nitrogen atoms. Examples of suitable substituted or unsubstituted monocyclic 3 to 6 membered heterocyclyl groups include, but are not limited to aziridine, oxirane, azetidine, oxetane, pyrrolidine, tetrahydrofuran, imidazoline, pyrazolidine, piperidine, tetrahydropyran, piperazine, morpholine, thiomorpholine and dioxane.

[0076] In some embodiments, R^4 can be NO_2 . In some embodiments, R^4 can be cyano. In some embodiments, R^4 can be halogen.

[0077] In some embodiments, R^4 can be an unsubstituted $\text{C}_1\text{-C}_6$ haloalkyl, such as those described herein. In some embodiments, R^4 can be -CF_3 .

[0078] In some embodiments, R^4 can be $\text{S(O)}R^6$. In some embodiments, R^4 can be SO_2R^6 . In some embodiments, R^4 can be SO_2CF_3 .

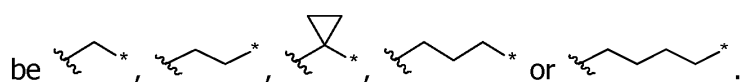
[0079] In some embodiments, R^6 can be a substituted or unsubstituted $\text{C}_1\text{-C}_6$ alkyl. For example, in some embodiments, R^6 can be a substituted $\text{C}_1\text{-C}_6$ alkyl, such as those described herein. In other embodiments, R^6 can be an unsubstituted $\text{C}_1\text{-C}_6$ alkyl, such as those described herein.

[0080] In some embodiments, R^6 can be a substituted or unsubstituted monocyclic or bicyclic $\text{C}_3\text{-C}_6$ cycloalkyl. For example, in some embodiments, R^6 can be a substituted monocyclic or bicyclic $\text{C}_3\text{-C}_6$ cycloalkyl. In other embodiments, R^6 can be an unsubstituted monocyclic or bicyclic $\text{C}_3\text{-C}_6$ cycloalkyl. Examples of suitable monocyclic or bicyclic $\text{C}_3\text{-C}_6$ cycloalkyl groups include, but are not limited to cyclopropyl, cyclobutyl, cyclopentyl, [1.1.1]bicyclopentyl and cyclohexyl.

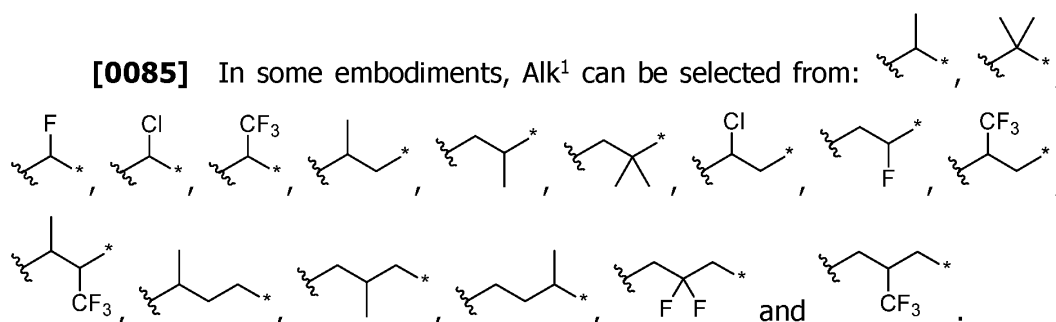
[0081] In some embodiments, R^6 can be a substituted or unsubstituted C_1 - C_6 haloalkyl, such as those described herein. In some embodiments, R^6 can be $-CF_3$.

[0082] In some embodiments, R^5 can be $-X^1-(Alk^1)_n-R^7$. In some embodiments, X^1 can be $-O-$. In some embodiments, X^1 can be $-S-$. In some embodiments, X^1 can be $-NH-$.

[0083] In some embodiments, Alk^1 can be unsubstituted $-(CH_2)_{1-4}-$ for which "*" represents the point of attachment to R^7 . In some embodiments, Alk^1 can



[0084] In some embodiments, Alk^1 can be a substituted $\text{---}C_1\text{---}C_4\text{ alkylene---}$ for which "*" represents the point of attachment to R^7 . For example, in some embodiments, Alk^1 can be a substituted methylene, a substituted ethylene, a substituted propylene or a substituted butylene. In some embodiments, Alk^1 can be mono-substituted, di-substituted or tri-substituted. In some embodiments, Alk^1 can be mono-substituted with a halogen (such as fluoro or chloro) or unsubstituted C_1 - C_3 alkyl, such as those described herein. In other embodiments, Alk^1 can be mono-substituted unsubstituted C_1 - C_3 haloalkyl, such as those described herein. In some embodiments, Alk^1 can be mono-substituted with fluoro or unsubstituted methyl. In some embodiments, Alk^1 can be di-substituted with one fluoro and one unsubstituted C_1 - C_3 alkyl, such as those described herein. In other embodiments, Alk^1 can be di-substituted with one unsubstituted C_1 - C_3 haloalkyl, such as those described herein, and one unsubstituted C_1 - C_3 alkyl, such as those described herein. In some embodiments, Alk^1 can be di-substituted with one fluoro and one unsubstituted methyl. In some embodiments, Alk^1 can be di-substituted with two independently selected unsubstituted C_1 - C_3 alkyl groups, such as those described herein. In some embodiments, Alk^1 can be di-substituted with unsubstituted methyl.



[0086] In some embodiments, n can be 0. When n is 0, those skilled in the art understand that X^1 is directly connected to R^7 . In some embodiments, n can be 1.

[0087] In some embodiments, R^7 can be a substituted or unsubstituted mono-substituted amine group. For example, R^7 can be an amino group mono-substituted with a substituted or unsubstituted C_1 - C_6 alkyl, a substituted or unsubstituted C_2 - C_6 alkenyl, a substituted or unsubstituted C_2 - C_6 alkynyl, a substituted or unsubstituted monocyclic or bicyclic C_3 - C_6 cycloalkyl, a substituted or unsubstituted monocyclic or bicyclic C_6 - C_{10} aryl, a substituted or unsubstituted monocyclic or bicyclic 5 to 10 membered heteroaryl, a substituted or unsubstituted monocyclic or bicyclic 3 to 10 membered heterocyclyl, a substituted or unsubstituted monocyclic or bicyclic C_3 - C_6 cycloalkyl(unsubstituted C_1 - C_6 alkyl), a substituted or unsubstituted monocyclic or bicyclic C_6 - C_{10} aryl(unsubstituted C_1 - C_6 alkyl), a substituted or unsubstituted monocyclic or bicyclic 5 to 10 membered heteroaryl(unsubstituted C_1 - C_6 alkyl) or a substituted or unsubstituted monocyclic or bicyclic 3 to 10 membered heterocyclyl(unsubstituted C_1 - C_6 alkyl). Examples of suitable mono-substituted amine groups include, but are not limited to $-NH(\text{methyl})$, $-NH(\text{isopropyl})$, $-NH(\text{cyclopropyl})$, $-NH(\text{phenyl})$, $-NH(\text{benzyl})$ and $-NH(\text{pyridine-3-yl})$.

[0088] In some embodiments, R^7 can be a substituted or unsubstituted di-substituted amine group. For example, R^7 can be an amino group substituted with two substituents independently selected from a substituted or unsubstituted C_1 - C_6 alkyl, a substituted or unsubstituted C_2 - C_6 alkenyl, a substituted or unsubstituted C_2 -

C₆ alkynyl, a substituted or unsubstituted monocyclic or bicyclic C₃-C₆ cycloalkyl, a substituted or unsubstituted monocyclic or bicyclic C₆-C₁₀ aryl, a substituted or unsubstituted monocyclic or bicyclic 5 to 10 membered heteroaryl, a substituted or unsubstituted monocyclic or bicyclic 3 to 10 membered heterocyclyl, a substituted or unsubstituted monocyclic or bicyclic C₃-C₆ cycloalkyl(unsubstituted C₁-C₆ alkyl), a substituted or unsubstituted monocyclic or bicyclic C₆-C₁₀ aryl(unsubstituted C₁-C₆ alkyl), a substituted or unsubstituted monocyclic or bicyclic 5 to 10 membered heteroaryl(unsubstituted C₁-C₆ alkyl) or a substituted or unsubstituted monocyclic or bicyclic 3 to 10 membered heterocyclyl(unsubstituted C₁-C₆ alkyl). In some embodiments the two substituents can be the same. In other embodiments the two substituents can be different. Examples of suitable di-substituted amine groups include, but are not limited to, -N(methyl)₂, -N(ethyl)₂, -N(isopropyl)₂, -N(benzyl)₂, -N(ethyl)(methyl), -N(isopropyl)(methyl), -N(ethyl)(isopropyl), -N(phenyl)(methyl) and -N(benzyl)(methyl).

[0089] In some embodiments, R⁷ can be selected from a substituted or unsubstituted N-carbamyl, a substituted or unsubstituted C-amido and a substituted or unsubstituted N-amido.

[0090] In some embodiments, R⁷ can be a substituted or unsubstituted C₃-C₁₀ cycloalkyl. In some embodiments, R⁷ can be a substituted or unsubstituted C₃-C₆ cycloalkyl. In some embodiments, R⁷ can be a substituted or unsubstituted monocyclic C₃-C₁₀ cycloalkyl. In other embodiments, R⁷ can be a substituted or unsubstituted bicyclic C₃-C₁₀ cycloalkyl, for example, a bridged, fused or spiro C₃-C₁₀ cycloalkyl. Suitable substituted or unsubstituted monocyclic or bicyclic C₃-C₁₀ cycloalkyl groups include, but are not limited to, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, cyclononyl, cyclodecyl, spiro[3.3]heptyl, spiro[2.3]hexyl, spiro[3.4]octyl, spiro[3.5]nonyl, spiro[3.6]decyl, spiro[2.4]heptyl, spiro[4.4]nonyl, spiro[4.5]decyl, spiro[2.5]octyl, spiro[3.5]nonyl, bicyclo[1.1.1]pentyl, bicyclo[2.1.1]hexyl, bicyclo[2.2.1]heptyl, decahydronaphthalenyl, octahydro-1H-indenyl, octahydropentalenyl, bicyclo[4.2.0]octyl, bicyclo[2.1.0]pentyl and bicyclo[3.2.0]heptyl.

[0091] In some embodiments, R^7 can be a substituted or unsubstituted C_6 - C_{10} spirocycloalkyl. In some embodiments, R^7 can be a substituted C_6 - C_{10} spirocycloalkyl. In other embodiments, R^7 can be an unsubstituted C_6 - C_{10} spirocycloalkyl. In some embodiments, R^7 can be a substituted or unsubstituted –cyclopropyl–cyclobutyl spiroalkyl, –cyclopropyl–cyclopentyl spiroalkyl, –cyclopropyl–cyclohexyl spiroalkyl, –cyclopropyl–cycloheptyl spiroalkyl, –cyclopropyl–cyclooctyl spiroalkyl, –cyclobutyl–cyclopropyl spiroalkyl, –cyclobutyl–cyclobutyl spiroalkyl, –cyclobutyl–cyclopentyl spiroalkyl, –cyclobutyl–cyclohexyl spiroalkyl, –cyclobutyl–cycloheptyl spiroalkyl, –cyclopentyl–cyclopropyl spiroalkyl, –cyclopentyl–cyclobutyl spiroalkyl, –cyclopentyl–cyclopentyl spiroalkyl, cyclopentyl–cyclohexyl spiroalkyl, –cyclohexyl–cyclopropyl spiroalkyl, –cyclohexyl–cyclobutyl spiroalkyl, –cyclohexyl–cyclopentyl spiroalkyl, –cycloheptyl–cyclopropyl spiroalkyl, –cycloheptyl–cyclobutyl spiroalkyl or –cyclooctyl–cyclopropyl spiroalkyl.

[0092] In some embodiments, R^7 can be a substituted or unsubstituted 3 to 10 membered heterocyclyl. In some embodiments, R^7 can be a substituted 3 to 10 membered heterocyclyl. In other embodiments, R^7 can be an unsubstituted 3 to 10 membered heterocyclyl. In some embodiments, R^7 can be a substituted or unsubstituted monocyclic 3 to 10 membered heterocyclyl. In other embodiments, R^7 can be a substituted or unsubstituted bicyclic 5 to 10 membered heterocyclyl, for example, a fused, bridged or spiro 5 to 10 membered heterocyclyl. Suitable substituted or unsubstituted 3 to 10 membered heterocyclyl groups include, but are not limited to, aziridine, oxirane, azetidine, oxetane, pyrrolidine, tetrahydrofuran, imidazoline, pyrazolidine, piperidine, tetrahydropyran, piperazine, morpholine, thiomorpholine, dioxane, 2-azaspiro[3.3]heptane, 2-oxaspiro[3.3]heptane, 2,6-diazaspiro[3.3]heptane, 2-oxa-6-azaspiro[3.3]heptane, 2-azaspiro[3.4]octane, 6-oxaspiro[3.4]octane, 6-oxa-2-azaspiro[3.4]octane, 7-oxa-2-azaspiro[3.5]nonane, 7-oxaspiro[3.5]nonane and 2-oxa-8-azaspiro[4.5]decane. In some embodiments, the substituted or unsubstituted monocyclic or bicyclic 3 to 10 membered heterocyclyl

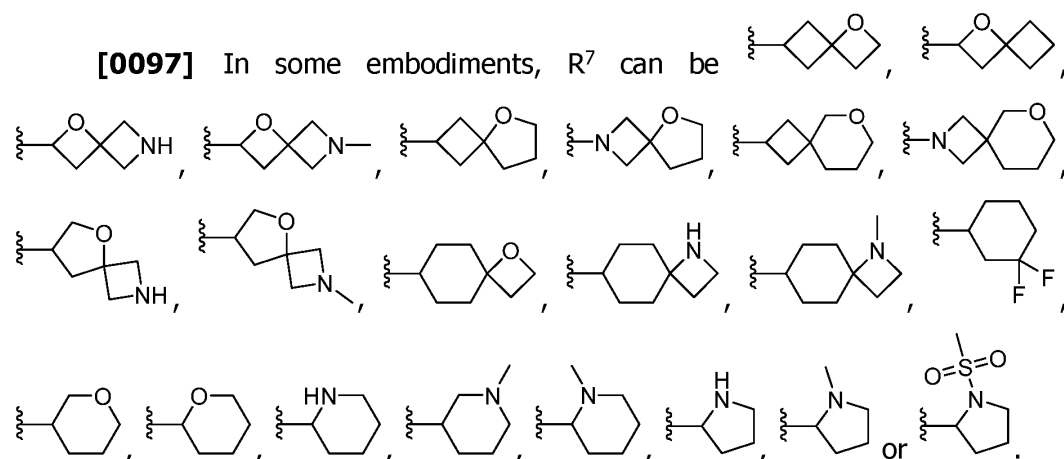
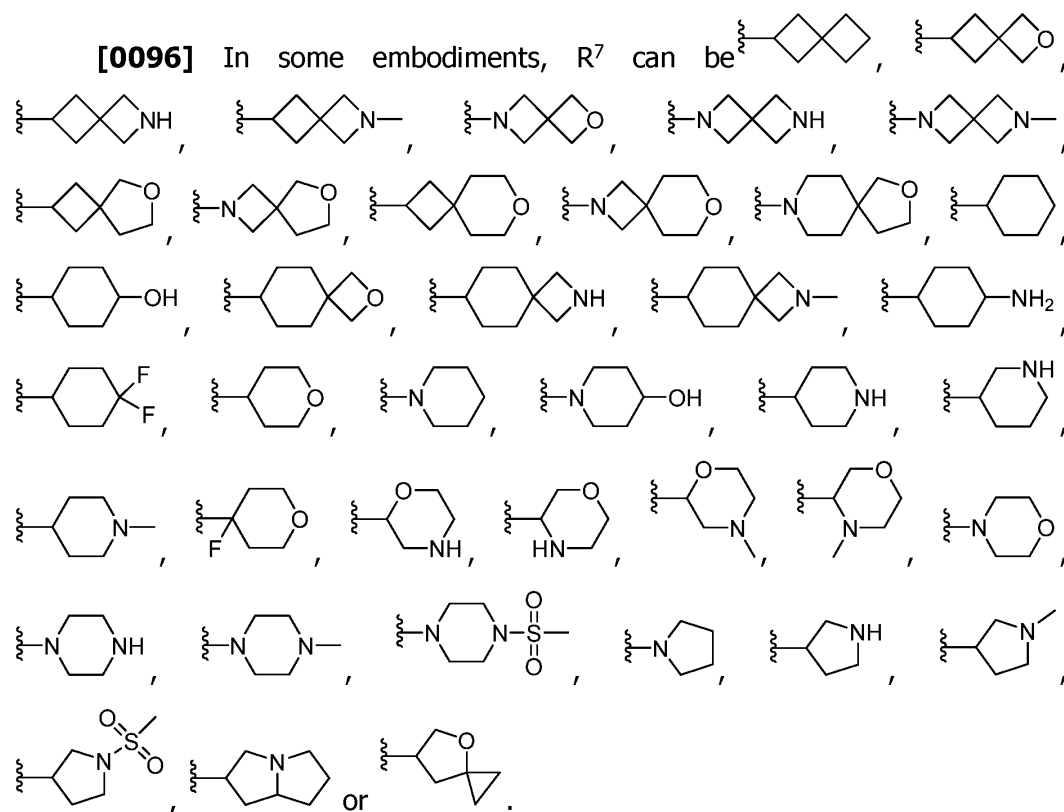
can be connected to the rest of the molecule through a nitrogen atom. In other embodiments, the substituted or unsubstituted monocyclic or bicyclic 3 to 10 membered heterocyclyl can be connected to the rest of the molecule through a carbon atom. In some embodiments, the substituted monocyclic or bicyclic 3 to 10 membered heterocyclyl can be substituted on one or more nitrogen atoms.

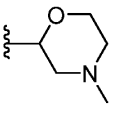
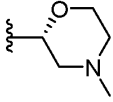
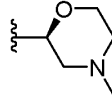
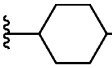
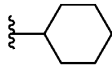
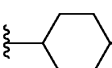
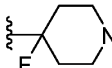
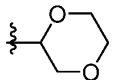
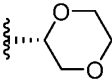
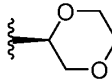
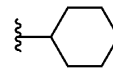
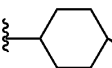
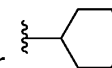
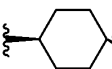
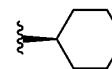
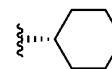
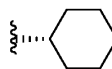
[0093] In some embodiments, R^7 can be a substituted or unsubstituted 6 to 10 membered spiro heterocyclyl. In some embodiments, R^7 can be a substituted 6 to 10 membered spiro heterocyclyl. In other embodiments, R^7 can be an unsubstituted 6 to 10 membered spiro heterocyclyl. In some embodiments, R^7 can be a substituted or unsubstituted azaspirohexane, azaspiroheptane, azaspirooctane, oxaspirohexane, oxaspiroheptane, oxaspirooctane, diazaspirohexane, diazaspiroheptane, diazaspirooctane, dioxaspirohexane, dioxaspiroheptane, dioxaspirooctane, oxa-azaspirohexane, oxa-azaspiroheptane or oxa-azaspirooctane. Suitable substituted or unsubstituted 3 to 10 membered heterocyclyl groups include, but are not limited to, 2-azaspiro[3.3]heptane, 2-oxaspiro[3.3]heptane, 2,6-diazaspiro[3.3]heptane, 2-oxa-6-azaspiro[3.3]heptane, 2-azaspiro[3.4]octane, 6-oxaspiro[3.4]octane, 6-oxa-2-azaspiro[3.4]octane, 7-oxa-2-azaspiro[3.5]nonane, 7-oxaspiro[3.5]nonane and 2-oxa-8-azaspiro[4.5]decane. In some embodiments, the substituted or unsubstituted 6 to 10 membered spiro heterocyclyl can be connected to the rest of the molecule through a nitrogen atom. In other embodiments, the substituted or unsubstituted 6 to 10 membered spiro heterocyclyl can be connected to the rest of the molecule through a carbon atom. In some embodiments, the substituted 6 to 10 membered spiroheterocyclyl can be substituted on one or more nitrogen atoms.

[0094] In some embodiments, R^7 can be hydroxy or amino.

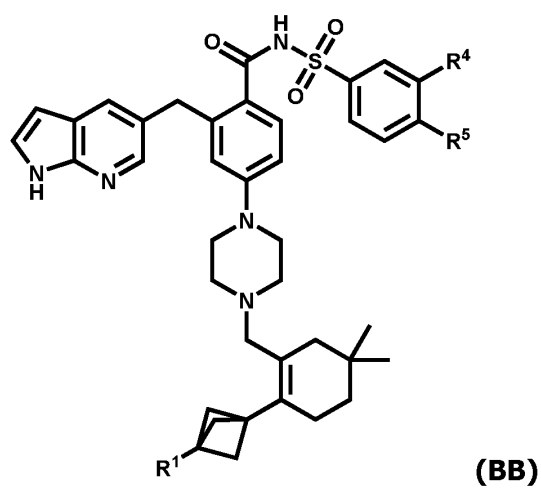
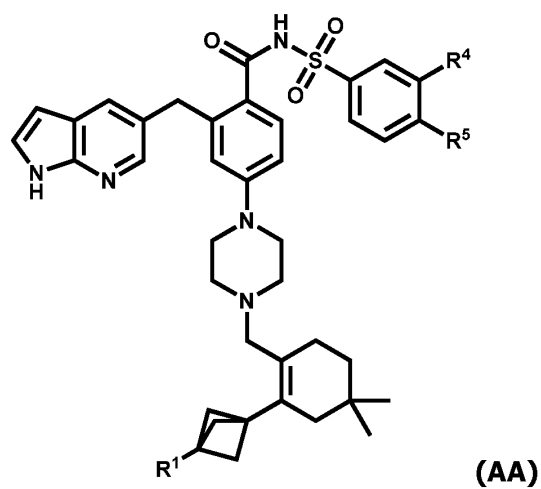
[0095] In some embodiments, R^7 can be unsubstituted. In other embodiments, R^7 can be substituted. In some embodiments, R^7 can be substituted with 1 or 2 substituents independently selected from an unsubstituted C_1 - C_6 alkyl (such as those described herein), an unsubstituted C_1 - C_6 alkoxy (such as those described herein), fluoro, chloro, hydroxy and $-SO_2$ -(unsubstituted C_1 - C_6 alkyl). For

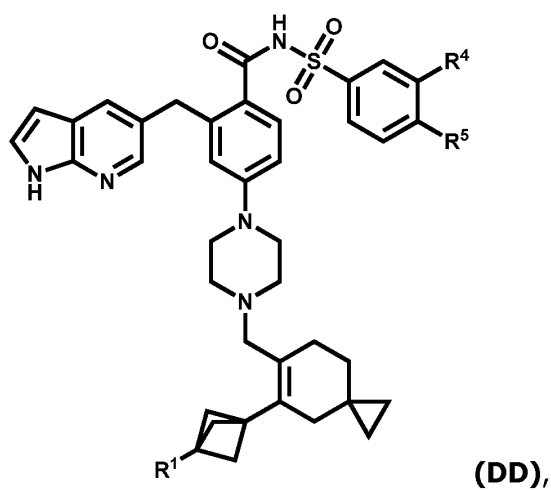
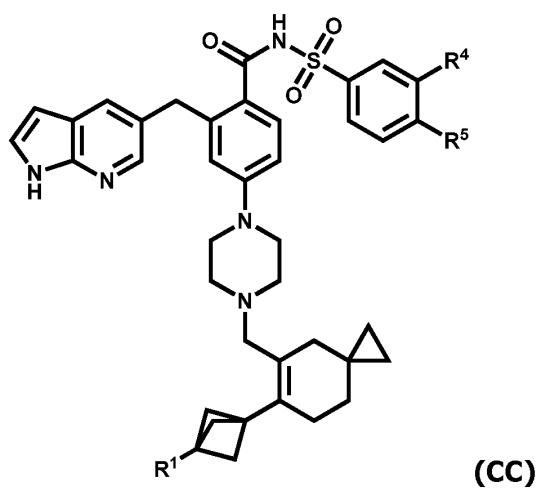
example, the C₁-C₆ alkoxy, C₃-C₁₀ cycloalkyl, 3 to 10 membered heterocyclyl, mono-substituted amine group, di-substituted amine group, N-carbamyl, C-amido and N-amido groups of R⁷ can be substituted with 1 or 2 substituents independently selected from any of the aforementioned substituents.



[0098] In some embodiments, R^7 can be . For example, in some embodiments R^7 can be  or . In some embodiments R^7 can be . For example, in some embodiments R^7 can be  or . In some embodiments R^7 can be . In some embodiments R^7 can be . For example, in some embodiments R^7 can be  or . In some embodiments R^7 can be . For example, in some embodiments R^7 can be  or , such as , ,  or .

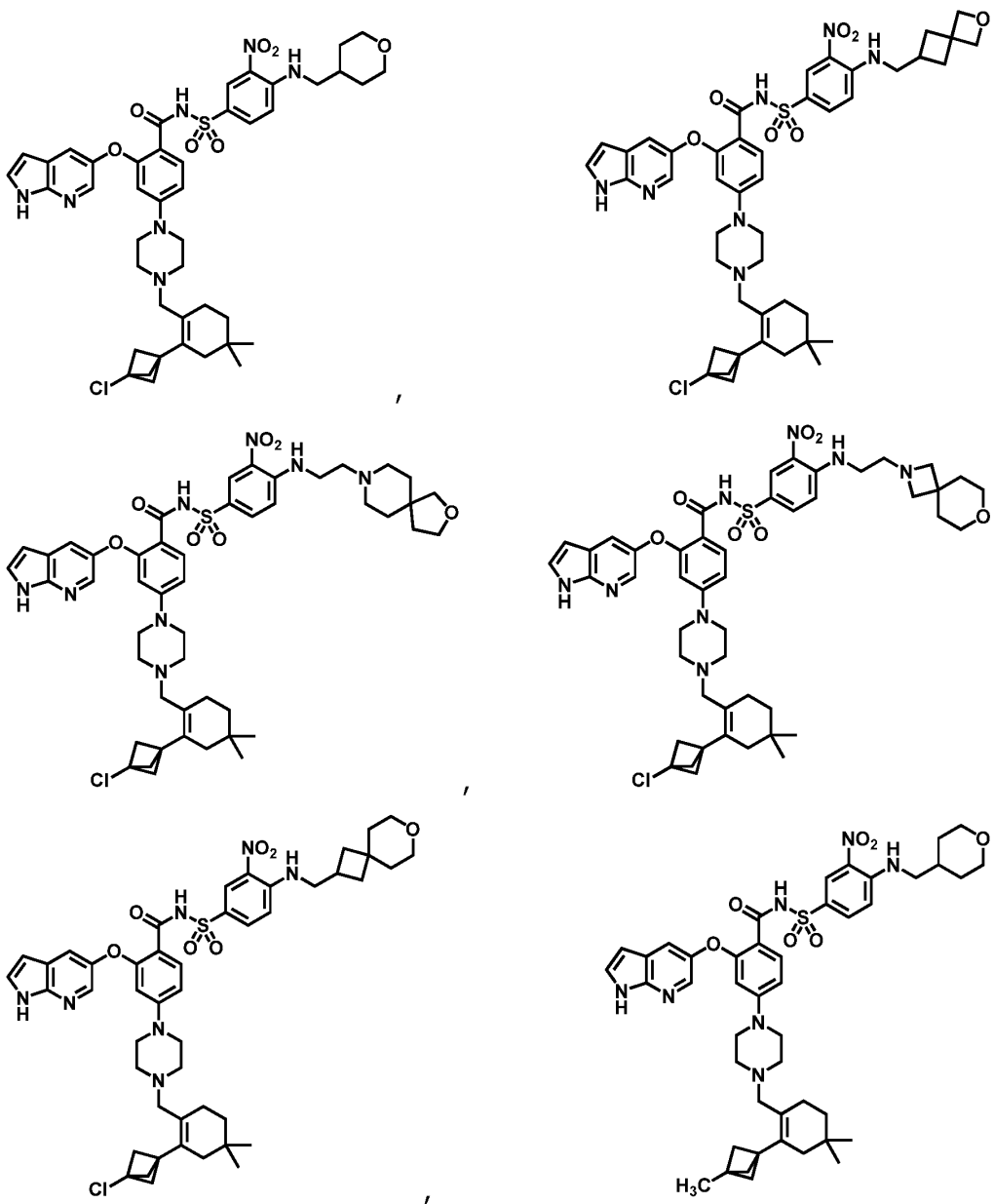
[0099] In some embodiments, the compound of Formula (A), or a pharmaceutically acceptable salt thereof, can be selected from a compound of Formula (AA), Formula (BB), Formula (CC) and Formula (DD):

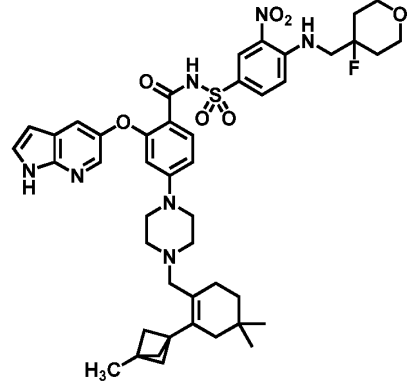
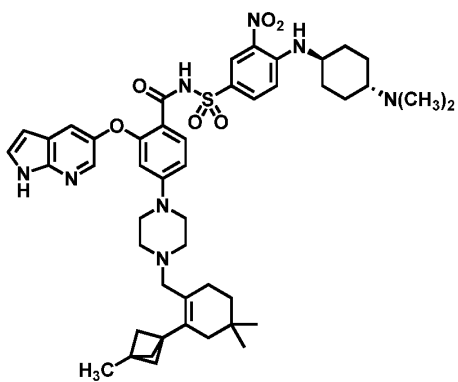
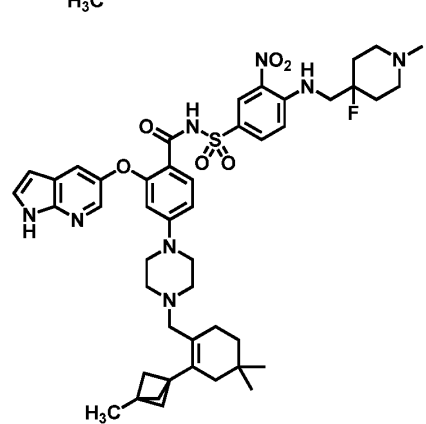
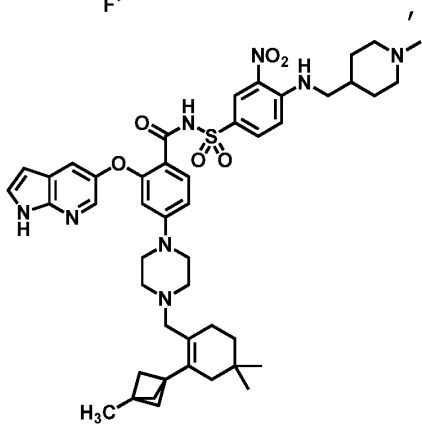
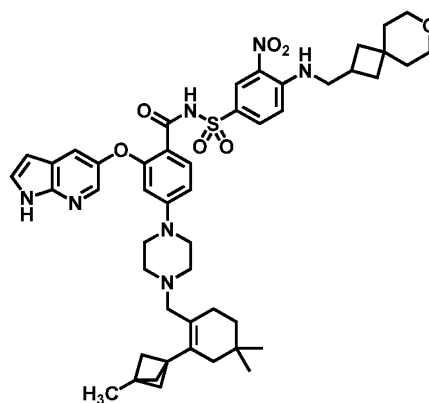
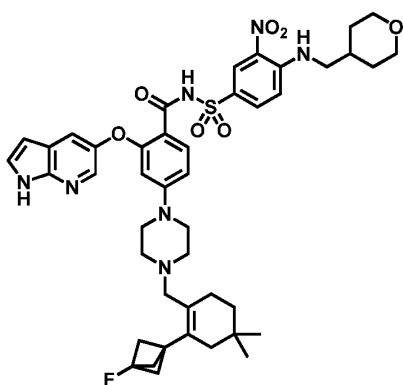


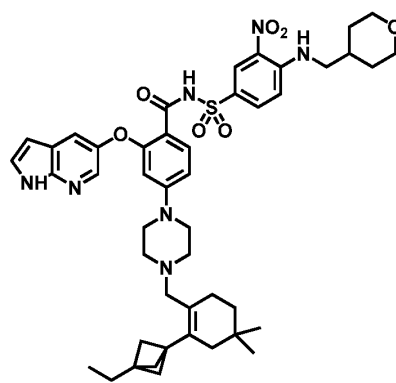
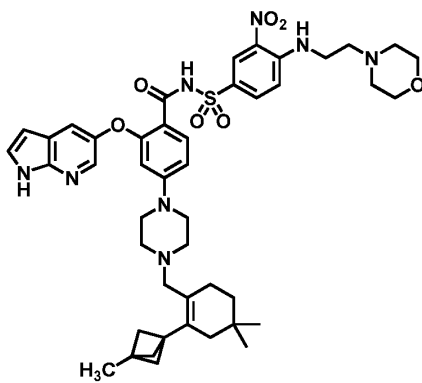
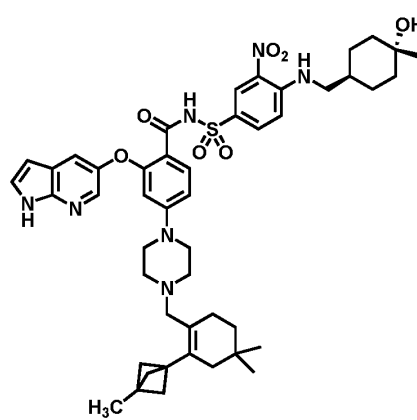
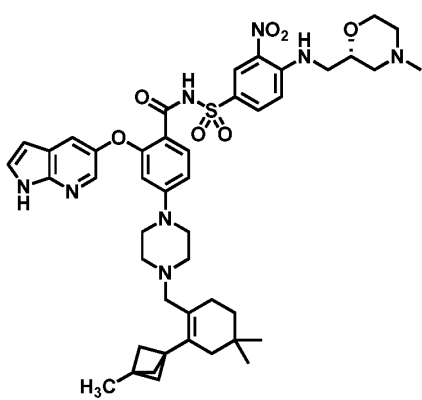
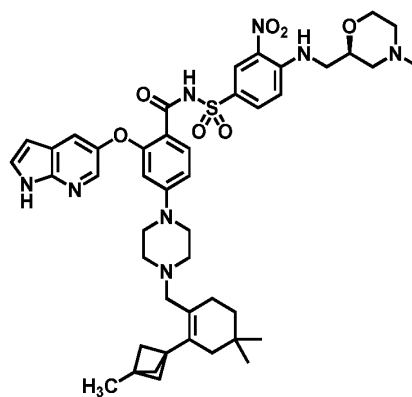
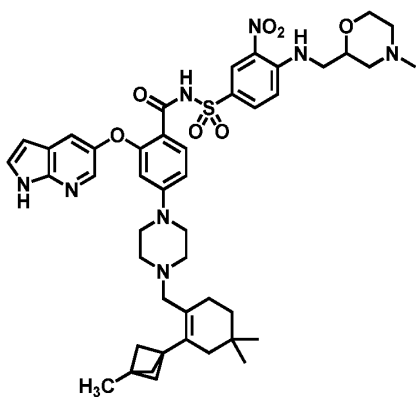


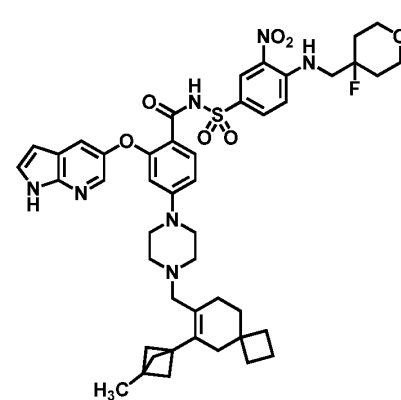
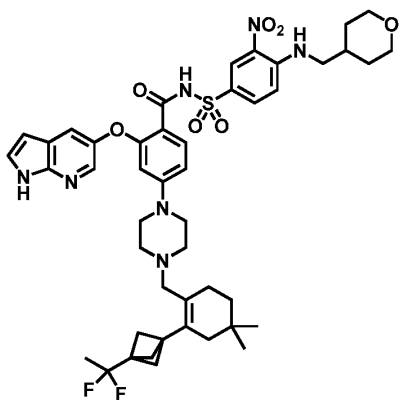
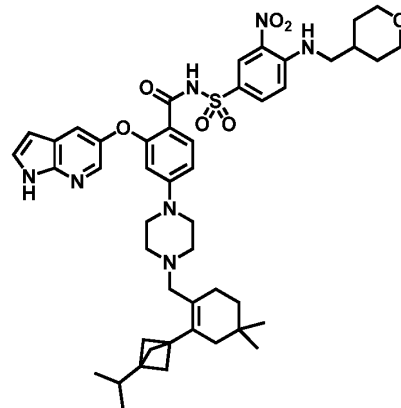
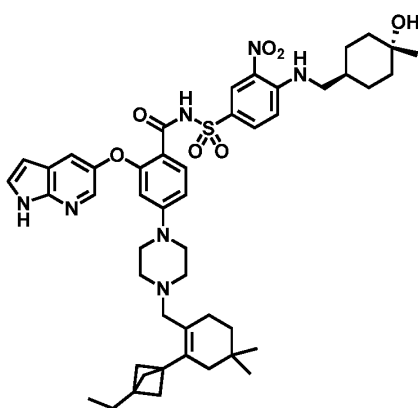
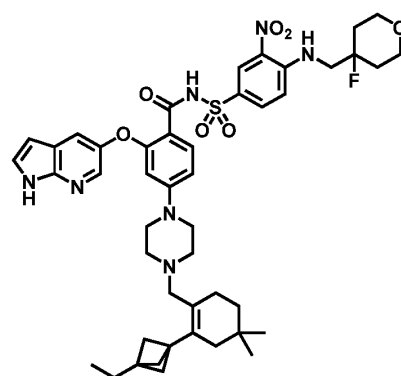
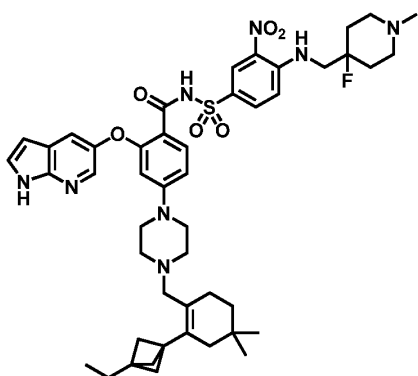
or pharmaceutically acceptable salts of any of the foregoing.

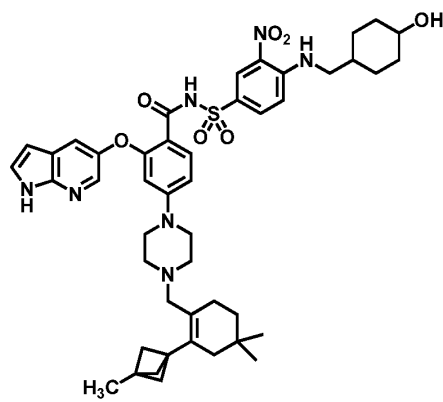
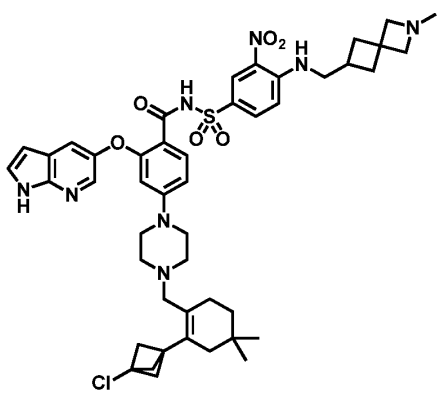
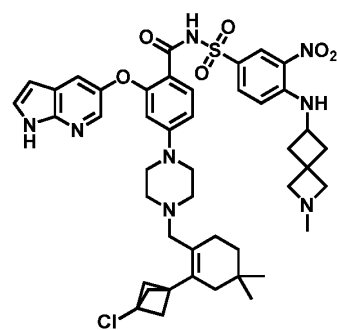
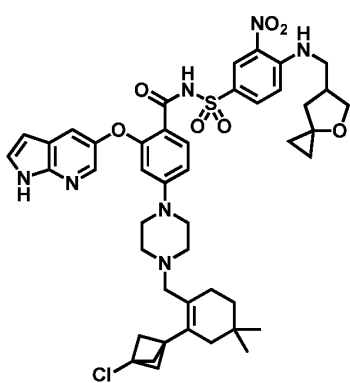
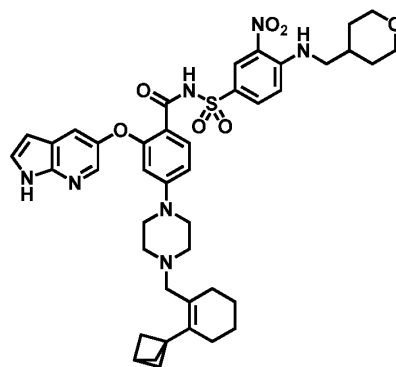
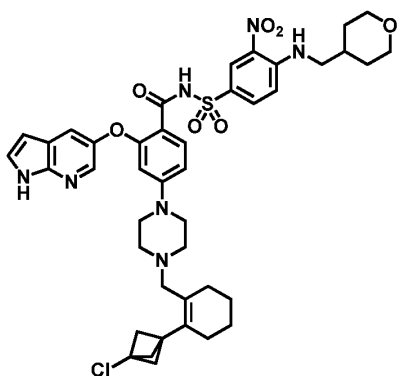
[0100] Examples of compounds of the Formula (A) include the following:

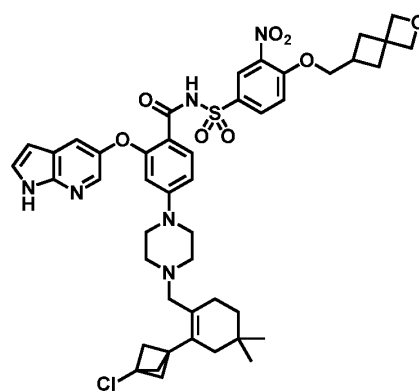
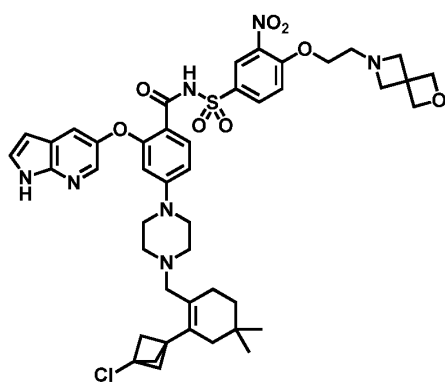
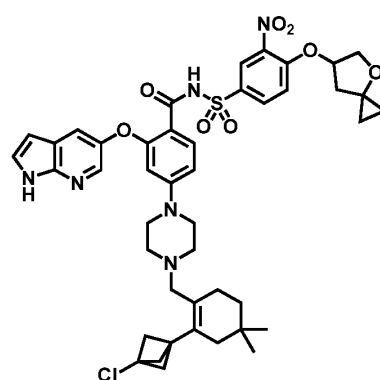
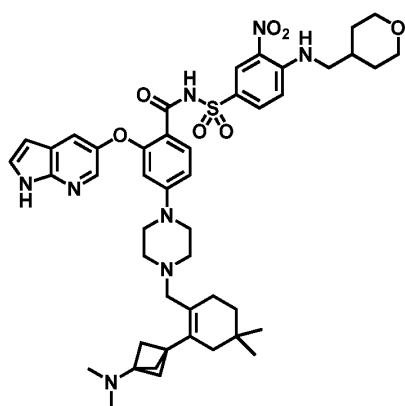
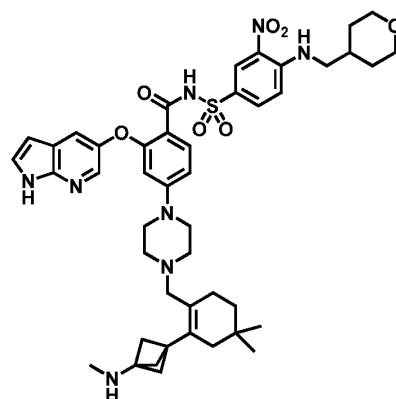
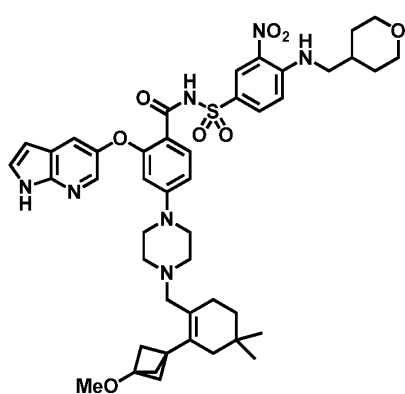


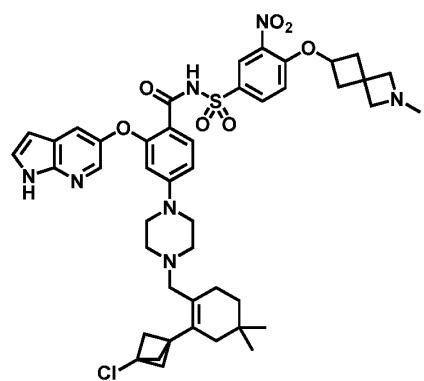
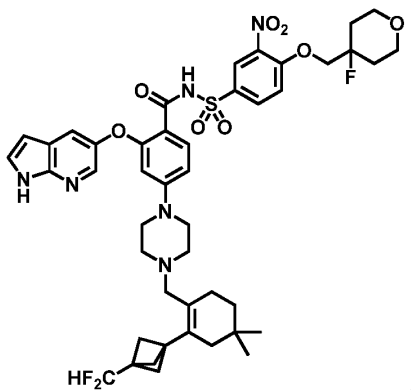
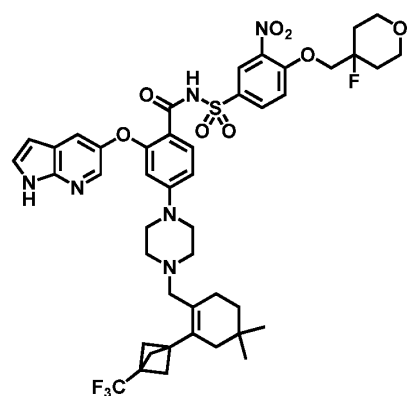
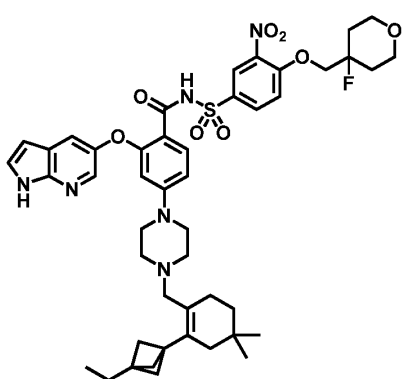
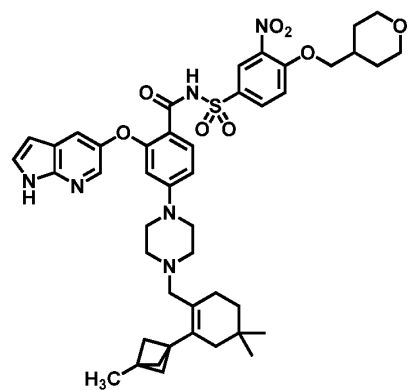
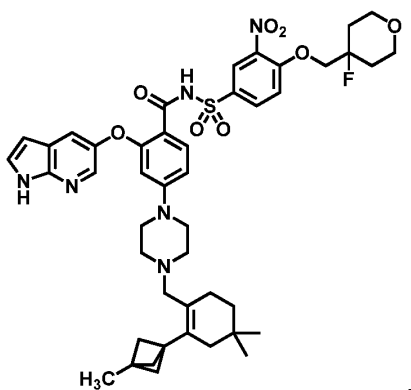


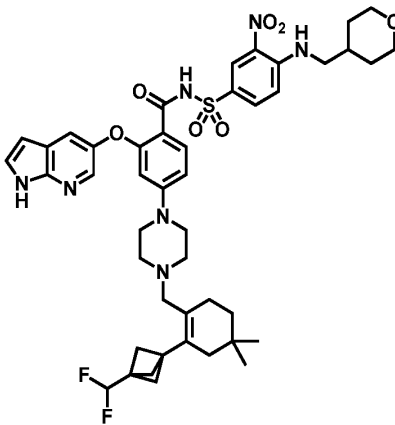
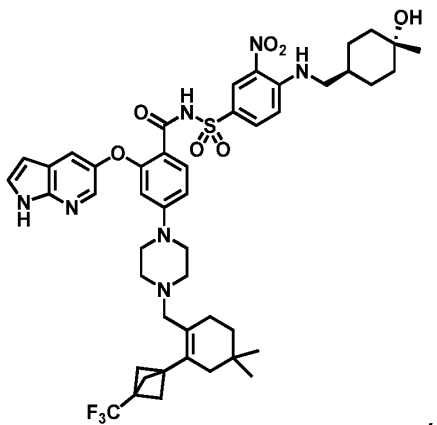
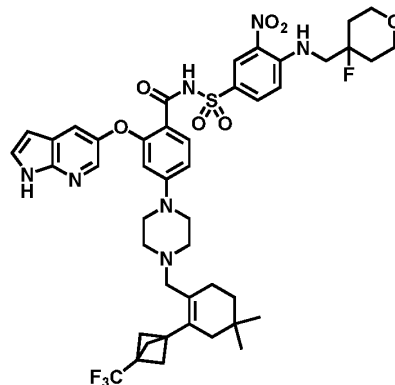
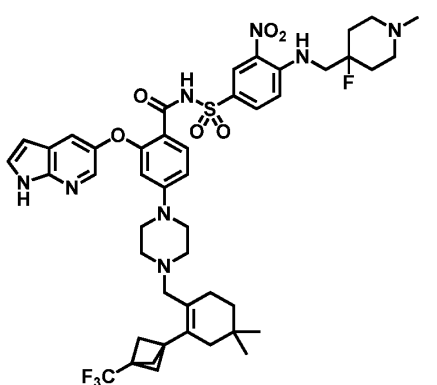
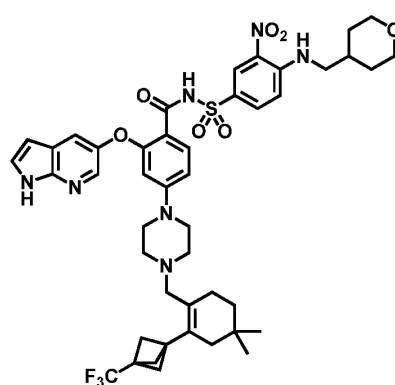
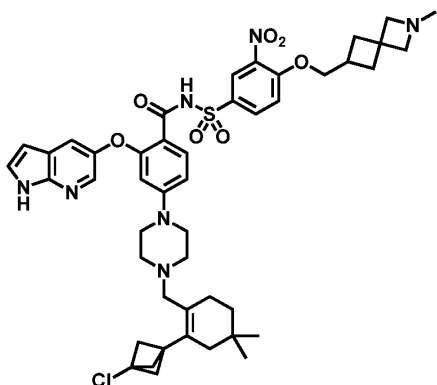


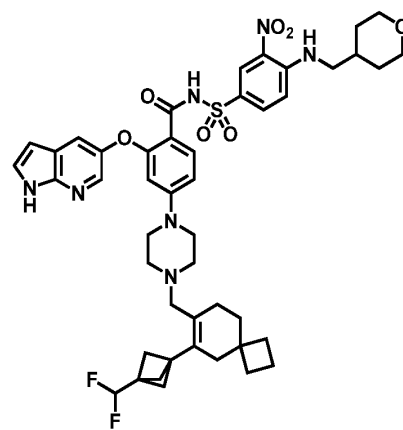
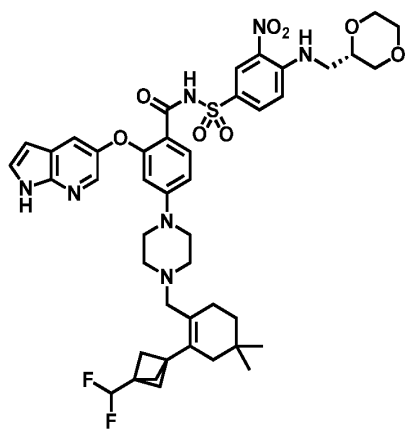
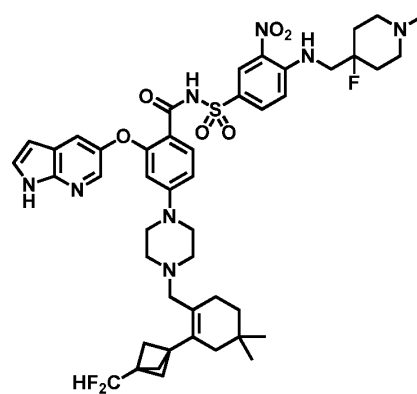
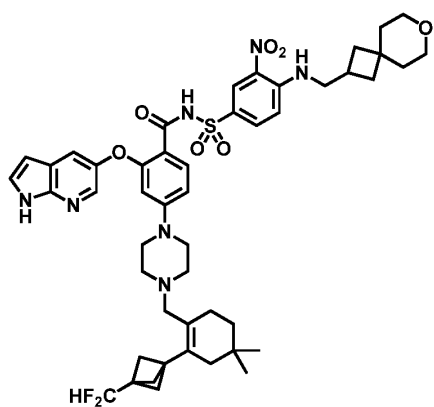
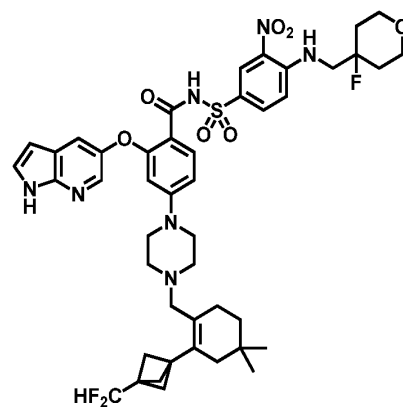
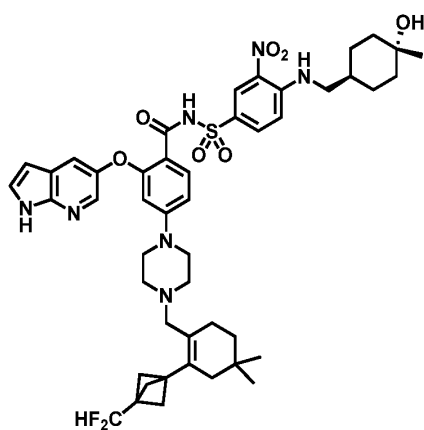


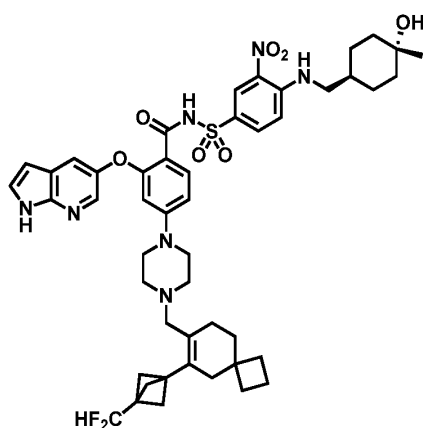




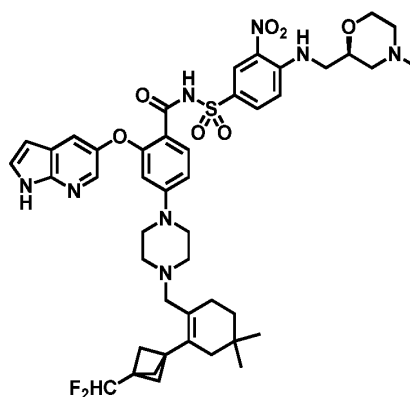








, and



, or a

pharmaceutically acceptable salt of any of the foregoing.

[0101] Compounds of the Formula (A), along with pharmaceutically acceptable salts thereof, can be prepared as described in WO 2019/139902, WO 2019/139900, WO 2019/139907 and WO 2019/139899, which are each hereby incorporated by reference in their entireties. As described in WO 2019/139902, WO 2019/139900, WO 2019/139907 and WO 2019/139899, compounds of the Formula (A) are Bcl-2 inhibitors.

[0102] In some embodiments, a compound of the Formula (A) can be used as a monotherapy for the treatment of amyloidosis. For example, a compound of Formula (A) can be used without another active ingredient.

[0103] In some embodiments, a compound of the Formula (A) is used in a combination of compounds for the treatment of amyloidosis. For example, in some embodiments, a compound of the Formula (A), or a pharmaceutically acceptable salt thereof, is used in combination with one or more other compounds of the Formula (A), or a pharmaceutically acceptable salt thereof, for the treatment of amyloidosis. In other embodiments, one or more compounds of the Formula (A), or a pharmaceutically acceptable salt thereof, are used in combination with another amyloidosis treatment. In some embodiments, the combination of compounds includes, in addition to an effective amount of a compound of Formula (A), an effective amount of one or more of Compound (B), or a pharmaceutically acceptable salt thereof. In some embodiments, the one or more of Compound (B) is a

corticosteroid, or a pharmaceutically acceptable salt thereof. Non-limiting examples of corticosteroids include hydrocortisone, hydrocortisone acetate, cortisone acetate, tixocortol pivalate, prednisolone, methylprednisolone, prednisone, beclometasone, betamethasone, dexamethasone, fluocortolone, halometasone, mometasone, Amcinonide, budesonide, desonide, fluocinolone acetonide, fluocinonide, halcinonide, triamcinolone acetonide, alclometasone dipropionate, betamethasone dipropionate, betamethasone valerate, clobetasol propionate, clobetasone butyrate, fluprednidene acetate, mometasone furoate, ciclesonide, cortisone acetate, hydrocortisone aceponate, hydrocortisone acetate, hydrocortisone buteprate, hydrocortisone butyrate, hydrocortisone valerate, prednicarbate, tixocortol pivalate, and pharmaceutically acceptable salts of any of the foregoing. In some embodiments, the one or more of Compound (B) can be a proteasome inhibitor, or a pharmaceutically acceptable salt thereof. Non-limiting examples of proteasome inhibitors include bortezomib, carfilzomib, and ixazomib. In some embodiments, the one or more of Compound (B) can be a corticosteroid, a proteasome inhibitor, or a pharmaceutically acceptable salt of any of the foregoing. In some embodiments, the one or more of Compound (B) can be a corticosteroid and a proteasome inhibitor, or a pharmaceutically acceptable salt of any of the foregoing.

[0104] The order of administration of compounds in a combination described herein can vary. In some embodiments, a compound of the Formula (A), including pharmaceutically acceptable salts thereof, can be administered prior to all of Compound (B), or a pharmaceutically acceptable salt thereof. In other embodiments, a compound of the Formula (A), including pharmaceutically acceptable salts thereof, can be administered prior to at least one Compound (B), or a pharmaceutically acceptable salt thereof. In still other embodiments, a compound of the Formula (A), including pharmaceutically acceptable salts thereof, can be administered concomitantly with Compound (B), or a pharmaceutically acceptable salt thereof. In yet still other embodiments, a compound of the Formula (A), including pharmaceutically acceptable salts thereof, can be administered subsequent to the administration of at least one Compound (B), or a pharmaceutically

acceptable salt thereof. In some embodiments, a compound of the Formula (A), including pharmaceutically acceptable salts thereof, can be administered subsequent to the administration of all Compound (B), or a pharmaceutically acceptable salt thereof.

[0105] There may be several advantages for using a combination of compounds described herein. For example, combining compounds that attack multiple pathways at the same time, can be more effective in treating amyloidosis, such as those described herein, compared to when the individual compounds of the combination are used as monotherapies.

[0106] In some embodiments, a combination as described herein of a compound of the Formula (A), including pharmaceutically acceptable salts thereof, and one or more of Compound (B), or pharmaceutically acceptable salts thereof, can decrease the number and/or severity of side effects that can be attributed to a compound described herein, such as Compound (B), or a pharmaceutically acceptable salt thereof.

[0107] Using a combination of compounds described herein can result in additive, synergistic or strongly synergistic effect for the treatment of amyloidosis. A combination of compounds described herein can result in an effect that is not antagonistic.

[0108] In some embodiments, a combination as described herein of two or more compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can result in an additive effect for the treatment of amyloidosis. In some embodiments, a combination as described herein of two or more compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can result in a synergistic effect. In some embodiments, a combination as described herein of two or more compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can result in a strongly synergistic effect. In some embodiments, a combination as described herein of two or more compounds of the Formula (A), including pharmaceutically acceptable salts thereof, is not antagonistic.

[0109] In some embodiments, a combination as described herein of a compound of the Formula (A), including pharmaceutically acceptable salts thereof, and one or more of Compound (B), or pharmaceutically acceptable salts thereof, can result in an additive effect for the treatment of amyloidosis. In some embodiments, a combination as described herein of a compound of the Formula (A), including pharmaceutically acceptable salts thereof, and one or more of Compound (B), or pharmaceutically acceptable salts thereof, can result in a synergistic effect. In some embodiments, a combination as described herein of a compound of the Formula (A), including pharmaceutically acceptable salts thereof, and one or more of Compound (B), or pharmaceutically acceptable salts thereof, can result in a strongly synergistic effect. In some embodiments, a combination as described herein of a compound of the Formula (A), including pharmaceutically acceptable salts thereof, and one or more of Compound (B), or pharmaceutically acceptable salts thereof, is not antagonistic.

[0110] As used herein, the term “antagonistic” means that the activity of the combination of compounds is less compared to the sum of the activities of the compounds in combination when the activity of each compound is determined individually (i.e., as a single compound). As used herein, the term “synergistic effect” means that the activity of the combination of compounds is greater than the sum of the individual activities of the compounds in the combination when the activity of each compound is determined individually. As used herein, the term “additive effect” means that the activity of the combination of compounds is about equal to the sum of the individual activities of the compounds in the combination when the activity of each compound is determined individually.

[0111] A potential advantage of utilizing a combination as described herein may be a reduction in the required amount(s) of the compound(s) that is effective in treating a disease condition disclosed herein compared to when each compound is administered as a monotherapy. For example, the amount of Compound (B), or a pharmaceutically acceptable salt thereof, used in a combination described herein can be less compared to the amount of Compound (B), or a pharmaceutically

acceptable salt thereof, needed to achieve the same reduction in a disease marker when administered as a monotherapy. Another potential advantage of utilizing a combination as described herein is that the use of two or more compounds having different mechanisms of action can create a higher barrier to the development of resistance compared to when a compound is administered as monotherapy. Additional advantages of utilizing a combination as described herein may include little to no cross resistance between the compounds of a combination described herein; different routes for elimination of the compounds of a combination described herein; and/or little to no overlapping toxicities between the compounds of a combination described herein.

Pharmaceutical Compositions

[0112] Compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can be provided in a pharmaceutical composition for the treatment of amyloidosis. Likewise, Compound (B), including pharmaceutically acceptable salts thereof, can be provided in a pharmaceutical composition.

[0113] The term “pharmaceutical composition” refers to a mixture of one or more compounds and/or salts disclosed herein with other chemical components, such as diluents, carriers and/or excipients. The pharmaceutical composition facilitates administration of the compound to an organism. Pharmaceutical compositions can also be obtained by reacting compounds with inorganic or organic acids such as hydrochloric acid, hydrobromic acid, sulfuric acid, nitric acid, phosphoric acid, methanesulfonic acid, ethanesulfonic acid, p-toluenesulfonic acid, and salicylic acid. Pharmaceutical compositions will generally be tailored to the specific intended route of administration.

[0114] As used herein, a “carrier” refers to a compound that facilitates the incorporation of a compound into cells or tissues. For example, without limitation, dimethyl sulfoxide (DMSO) is a commonly utilized carrier that facilitates the uptake of many organic compounds into cells or tissues of a subject.

[0115] As used herein, a “diluent” refers to an ingredient in a pharmaceutical composition that lacks appreciable pharmacological activity but may be pharmaceutically necessary or desirable. For example, a diluent may be used to increase the bulk of a potent drug whose mass is too small for manufacture and/or administration. It may also be a liquid for the dissolution of a drug to be administered by injection, ingestion or inhalation. A common form of diluent in the art is a buffered aqueous solution such as, without limitation, phosphate buffered saline that mimics the pH and isotonicity of human blood.

[0116] As used herein, an “excipient” refers to an essentially inert substance that is added to a pharmaceutical composition to provide, without limitation, bulk, consistency, stability, binding ability, lubrication, disintegrating ability etc., to the composition. For example, stabilizers such as anti-oxidants and metal-chelating agents are excipients. In an embodiment, the pharmaceutical composition comprises an anti-oxidant and/or a metal-chelating agent. A “diluent” is a type of excipient.

[0117] In some embodiments, compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can be provided in a monotherapy pharmaceutical composition for the treatment of amyloidosis. In some embodiments, Compound (B), along with pharmaceutically acceptable salts thereof, can be provided in a pharmaceutical composition that includes a compound of the Formula (A), including pharmaceutically acceptable salts thereof. In other embodiments, Compound (B), along with pharmaceutically acceptable salts thereof, can be administered in a pharmaceutical composition that is separate from a pharmaceutical composition that includes a compound of the Formula (A), including pharmaceutically acceptable salts thereof.

[0118] The pharmaceutical compositions described herein can be administered to a human patient *per se*, or in pharmaceutical compositions where they are mixed with other active ingredients, as in combination therapy, or carriers, diluents, excipients or combinations thereof. Proper formulation is dependent upon

the route of administration chosen. Techniques for formulation and administration of the compounds described herein are known to those skilled in the art.

[0119] The pharmaceutical compositions disclosed herein may be manufactured in a manner that is itself known, *e.g.*, by means of conventional mixing, dissolving, granulating, dragee-making, levigating, emulsifying, encapsulating, entrapping or tableting processes. Additionally, the active ingredients are contained in an amount effective to achieve its intended purpose. Many of the compounds used in the pharmaceutical combinations disclosed herein may be provided as salts with pharmaceutically compatible counterions.

[0120] Multiple techniques of administering a compound, salt and/or composition exist in the art including, but not limited to, oral, rectal, pulmonary, topical, aerosol, injection, infusion and parenteral delivery, including intramuscular, subcutaneous, intravenous, intramedullary injections, intrathecal, direct intraventricular, intraperitoneal, intranasal and intraocular injections. In some embodiments, compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can be administered orally. In some embodiments, compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can be provided to a subject by the same route of administration as Compound (B), along with pharmaceutically acceptable salts thereof. In other embodiments, compounds of the Formula (A), including pharmaceutically acceptable salts thereof, can be provided to a subject by a different route of administration as Compound (B), along with pharmaceutically acceptable salts thereof.

[0121] One may also administer the compound, salt and/or composition in a local rather than systemic manner, for example, via injection or implantation of the compound directly into the affected area, often in a depot or sustained release formulation. Furthermore, one may administer the compound in a targeted drug delivery system, for example, in a liposome coated with a tissue-specific antibody. The liposomes will be targeted to and taken up selectively by the organ. For example, intranasal or pulmonary delivery to target a respiratory disease or condition may be desirable.

[0122] The compositions may, if desired, be presented in a pack or dispenser device which may contain one or more unit dosage forms containing the active ingredient. The pack may for example comprise metal or plastic foil, such as a blister pack. The pack or dispenser device may be accompanied by instructions for administration. The pack or dispenser may also be accompanied with a notice associated with the container in form prescribed by a governmental agency regulating the manufacture, use, or sale of pharmaceuticals, which notice is reflective of approval by the agency of the form of the drug for human or veterinary administration. Such notice, for example, may be the labeling approved by the U.S. Food and Drug Administration for prescription drugs, or the approved product insert. Compositions that can include a compound and/or salt described herein formulated in a compatible pharmaceutical carrier may also be prepared, placed in an appropriate container, and labeled for treatment of an indicated condition.

Uses and Methods of Treatment

[0123] As provided herein, in some embodiments, an effective amount of a compound of the Formula (A), including pharmaceutically acceptable salts thereof, can be used to treat amyloidosis.

[0124] Various types of amyloidosis are known and can be treated using the monotherapies and combination therapies described herein. In some embodiments, the amyloidosis is selected from the group consisting of amyloid light-chain (AL) amyloidosis, amyloid type A (AA) amyloidosis, dialysis-related amyloidosis (DRA), familial or hereditary amyloidosis, age-related (senile) systemic amyloidosis, organ-specific amyloidosis and combinations thereof. A subject can have an amyloidosis that has not been previously treated.

[0125] In some cases, following amyloidosis treatment, a subject can relapse or have reoccurrence of the amyloidosis. As used herein, the terms "relapse" and "reoccurrence" are used in their normal sense as understood by those skilled in the art. Thus, the amyloidosis can be a recurrent amyloidosis. In some

embodiments, the subject has relapsed after a previous treatment for AL amyloidosis.

[0126] As used herein, a "subject" refers to an animal that is the object of treatment, observation or experiment. "Animal" includes cold- and warm-blooded vertebrates and invertebrates such as fish, shellfish, reptiles and, in particular, mammals. "Mammal" includes, without limitation, mice, rats, rabbits, guinea pigs, dogs, cats, sheep, goats, cows, horses, primates, such as monkeys, chimpanzees, and apes, and, in particular, humans. In some embodiments, the subject can be human. In some embodiments, the subject can be a child and/or an infant, for example, a child or infant with a fever. In other embodiments, the subject can be an adult.

[0127] As used herein, the terms "treat," "treating," "treatment," "therapeutic," and "therapy" do not necessarily mean total cure or abolition of the disease or condition. Any alleviation of any undesired signs or symptoms of the disease or condition, to any extent can be considered treatment and/or therapy. Furthermore, treatment may include acts that may worsen the subject's overall feeling of well-being or appearance.

[0128] The term "effective amount" is used to indicate an amount of an active compound, or pharmaceutical agent, that elicits the biological or medicinal response indicated. For example, an effective amount of compound, salt or composition can be the amount needed to prevent, alleviate or ameliorate symptoms of the disease or condition, or prolong the survival of the subject being treated. This response may occur in a tissue, system, animal or human and includes alleviation of the signs or symptoms of the disease or condition being treated. Determination of an effective amount is well within the capability of those skilled in the art, in view of the disclosure provided herein. The effective amount of the compounds disclosed herein required as a dose will depend on the route of administration, the type of animal, including human, being treated and the physical characteristics of the specific animal under consideration. The dose can be tailored to achieve a desired effect, but will depend on such factors as weight, diet,

concurrent medication and other factors which those skilled in the medical arts will recognize.

[0129] For example, an effective amount of a compound, is the amount that results in the reduction, alleviation or disappearance of one or more symptoms caused by the amyloidosis.

[0130] The amount of compound, salt and/or composition required for use in treatment will vary not only with the particular compound or salt selected but also with the route of administration, the nature and/or symptoms of the disease or condition being treated and the age and condition of the patient and will be ultimately at the discretion of the attendant physician or clinician. In cases of administration of a pharmaceutically acceptable salt, dosages may be calculated as the free base. As will be understood by those of skill in the art, in certain situations it may be necessary to administer the compounds disclosed herein in amounts that exceed, or even far exceed, the dosage ranges described herein in order to effectively and aggressively treat particularly aggressive diseases or conditions.

[0131] As will be readily apparent to one skilled in the art, the useful *in vivo* dosage to be administered and the particular mode of administration will vary depending upon the age, weight, the severity of the affliction, the mammalian species treated, the particular compounds employed and the specific use for which these compounds are employed. The determination of effective dosage levels, that is the dosage levels necessary to achieve the desired result, can be accomplished by one skilled in the art using routine methods, for example, human clinical trials, *in vivo* studies and *in vitro* studies. For example, useful dosages of a compound of Formulae (A) and/or (B), or pharmaceutically acceptable salts of the foregoing, can be determined by comparing their *in vitro* activity, and *in vivo* activity in animal models. Such comparison can be done by comparison against an established amyloidosis treatment.

[0132] Dosage amount and interval may be adjusted individually to provide plasma levels of the active moiety which are sufficient to maintain the modulating effects, or minimal effective concentration (MEC). The MEC will vary for

each compound but can be estimated from *in vivo* and/or *in vitro* data. Dosages necessary to achieve the MEC will depend on individual characteristics and route of administration. However, HPLC assays or bioassays can be used to determine plasma concentrations. Dosage intervals can also be determined using MEC value. Compositions should be administered using a regimen which maintains plasma levels above the MEC for 10-90% of the time, preferably between 30-90% and most preferably between 50-90%. In cases of local administration or selective uptake, the effective local concentration of the drug may not be related to plasma concentration.

[0133] It should be noted that the attending physician would know how to and when to terminate, interrupt or adjust administration due to toxicity or organ dysfunctions. Conversely, the attending physician would also know to adjust treatment to higher levels if the clinical response were not adequate (precluding toxicity). The magnitude of an administered dose in the management of the disorder of interest will vary with the severity of the disease or condition to be treated and to the route of administration. The severity of the disease or condition may, for example, be evaluated, in part, by standard prognostic evaluation methods. Further, the dose and perhaps dose frequency, will also vary according to the age, body weight and response of the individual patient. A program comparable to that discussed above may be used in veterinary medicine.

[0134] Compounds, salts and compositions disclosed herein can be evaluated for efficacy and toxicity using known methods. For example, the toxicology of a particular compound, or of a subset of the compounds, sharing certain chemical moieties, may be established by determining *in vitro* toxicity towards a cell line, such as a mammalian, and preferably human, cell line. The results of such studies are often predictive of toxicity in animals, such as mammals, or more specifically, humans. Alternatively, the toxicity of particular compounds in an animal model, such as mice, rats, rabbits, dogs or monkeys, may be determined using known methods. The efficacy of a particular compound may be established using several recognized methods, such as *in vitro* methods, animal models, or

human clinical trials. When selecting a model to determine efficacy, the skilled artisan can be guided by the state of the art to choose an appropriate model, dose, route of administration and/or regime.

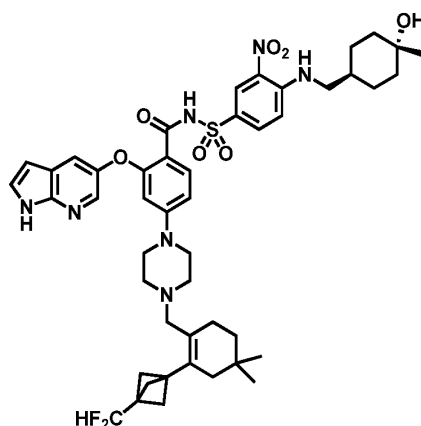
EXAMPLES

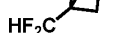
[0135] Additional embodiments are disclosed in further detail in the following examples, which are not in any way intended to limit the scope of the claims.

Multiple Myeloma Models

[0136] Multiple myeloma (MM) cell lines were selected that contain a t(11;14) translocation (i.e. KMS-12BM) or do not contain a t(11;14) translocation (i.e. OPM-2). It is understood that compound activity in MM models is predictive of activity in amyloidosis (e.g. AL amyloidosis) models and/or patients.

[0137] The single agent activity of Compound (A) was assessed in an OPM-2 mouse model, as shown in Figure 1. Mice were inoculated with OPM-2 cells subcutaneously on the right flank with the single cell suspension of 95% viable tumor cells (1×10^7) in 200 μ L RPMI-1640 Matrigel mixture (1:1 ratio) without serum for the tumor development. The treatment was started when the mean tumor size reached approximately 200 mm³, with individual tumor size ranging from 180-220 mm³. Animals were randomly distributed into treatment groups of 10 animals each and dosed with either vehicle (i.e. "Vehicle A") or a compound of



Formula (A) having the structure  ("Compound (A)") at 100 mg/kg administered by oral gavage once a day. Tumor volumes were evaluated twice per week to calculate tumor volume over time, and mice were weighed twice per week as a surrogate for signs of toxicity. Tumor growth inhibition (TGI) efficiency was calculated using the following equation $TGI = (1 - (T_d - T_0) / (C_d - C_0)) \times 100\%$. T_d and C_d are the mean tumor volumes of the treated and control animals, and T_0 and C_0 are the mean tumor volumes of the treated and control animals at the start of the experiment. Figure 1 depicts the mean tumor volume results of the study, which shows that administration of single agent treatment of Compound (A) resulted in tumor growth inhibition and 46% TGI efficacy after 10 days.

[0138] The single agent activity of Compound (A) was assessed in a KMS-12-BM mouse model, as shown in Figure 2. Mice were inoculated with KMS-12-BM cells subcutaneously on the right flank with the single cell suspension of 95% viable tumor cells (1×10^7) in 200 μ L RPMI-1640 Matrigel mixture (1:1 ratio) without serum for the tumor development. The treatment was started when the mean tumor size reached approximately 200 mm³, with individual tumor size ranging from 180-220 mm³. Animals were randomly distributed into treatment groups of 10 animals each and dosed with either vehicle or Compound (A) at 100 mg/kg administered by oral gavage once a day. Tumor volumes were evaluated twice per week to calculate tumor volume over time, and mice were weighed twice per week as a surrogate for signs of toxicity. Tumor growth inhibition (TGI) efficiency was

calculated using the following equation $TGI = (1 - (T_d - T_0) / (C_d - C_0)) \times 100\%$. T_d and C_d are the mean tumor volumes of the treated and control animals, and T_0 and C_0 are the mean tumor volumes of the treated and control animals at the start of the experiment. Figure 2 depicts the mean tumor volume results of the study, which shows that administration of single agent treatment of Compound (A) resulted in tumor growth inhibition and 62.8% TGI efficacy after 14 days.

[0139] The combination effect of Compound (A) with dexamethasone was studied in a KMS-12-BM mouse model, as shown in Figure 3. Mice were inoculated with KMS-12-BM cells subcutaneously on the right flank with the single cell suspension of 95% viable tumor cells (1×10^7) in 200 μ L RPMI-1640 Matrigel mixture (1:1 ratio) without serum for the tumor development. The treatment was started when the mean tumor size reached approximately 200 mm³, with individual tumor size ranging from 180-220 mm³. Animals were randomly distributed into treatment groups of 10 animals each and each grouping was dosed with vehicle or compound(s) at the indicated dosage and frequency as provided in Figure 3. As shown in Figure 3, the compound(s) administered to the animals include Compound (A) at 100 mg/kg p.o. qd $\times$ 21 (squares), dexamethasone at 1 mg/kg IP at 5 days on 2 days off (triangles), and Compound (A) at 100 mg/kg p.o. qd $\times$ 21 + dexamethasone at 1 mg/kg at 5 days on 2 days off (open circles, bottom line). Tumor volumes were evaluated twice per week to calculate tumor volume over time, and mice were weighed twice per week as a surrogate for signs of toxicity. Tumor growth inhibition (TGI) was calculated using the following equation $TGI = (1 - (T_d - T_0) / (C_d - C_0)) \times 100\%$. T_d and C_d are the mean tumor volumes of the treated and control animals, and T_0 and C_0 are the mean tumor volumes of the treated and control animals at the start of the experiment. Figure 3 shows that single agent treatment of Compound (A) or dexamethasone resulted in tumor growth inhibition of 62.8% and 22.5%, respectively, on day 14. In addition, the combination of Compound (A) and dexamethasone resulted in TGI of 73.1% on day 14, which is an improved efficacy relative to the single agent treatments.

[0140] The combination effect of Compound (A) with bortezomide was studied in a KMS-12-BM mouse model, as shown in Figure 4. Mice were inoculated with KMS-12-BM cells subcutaneously on the right flank with the single cell suspension of 95% viable tumor cells (1×10^7) in 200 μ L RPMI-1640 Matrigel mixture (1:1 ratio) without serum for the tumor development. The treatment was started when the mean tumor size reached approximately 200 mm³, with individual tumor size ranging from 180-220 mm³. Animals were randomly distributed into treatment groups of 10 animals each and each grouping was dosed with vehicle or indicated compound(s) at indicated dosage and frequency as provided in Figure 4. As shown in Figure 4, the compound(s) administered to the animals include Compound A at 50 mg/kg p.o. qd x 21 (squares), bortezomib at 0.5 mg/kg BIW IP at twice a week (triangles), and Compound A at 50 mg/kg p.o. qd x 21 + bortezomib at 0.5 mg/kg IP BIW at twice a week (circles, bottom line). Tumor volumes were evaluated twice per week to calculate tumor volume over time, and mice were weighed twice per week as a surrogate for signs of toxicity. Tumor growth inhibition (TGI) was calculated using the following equation $TGI = (1 - (T_d - T_0) / (C_d - C_0)) \times 100\%$. T_d and C_d are the mean tumor volumes of the treated and control animals, and T_0 and C_0 are the mean tumor volumes of the treated and control animals at the start of the experiment. Figure 4 shows that single agent treatment of Compound A or bortezomib resulted in tumor growth inhibition of 48.7% and 46.5%, respectively, on day 14. In addition, the combination of Compound A and bortezomib resulted in TGI of 77.3% on day 14, which is an improved efficacy relative to the single agent treatments.

[0141] Furthermore, although the foregoing has been described in some detail by way of illustrations and examples for purposes of clarity and understanding, it will be understood by those of skill in the art that numerous and various modifications can be made without departing from the spirit of the present disclosure. Therefore, it should be clearly understood that the forms disclosed

herein are illustrative only and are not intended to limit the scope of the present disclosure, but rather to also cover all modification and alternatives coming with the true scope and spirit of the present disclosure.