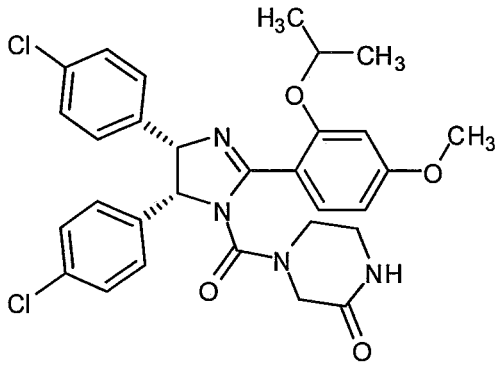
suitable for administration in at least two treatment cycles, wherein each treatment cycle independently comprises a treatment course of from 1 day to 3 months followed by a non-treatment interval of at least 2 weeks; provided that if the senolytic agent is an MDM2 inhibitor, the MDM2 inhibitor is administered as a monotherapy, and each treatment course is at least 5 days long during which the MDM2 inhibitor is administered on at least 5 days; wherein the senescence-associated disease or disorder is not a cancer. The senolytic agents described herein may be used for the manufacture of a medicament for treating a senescence-associated disease or disorder as described herein.

Also provided herein is a unit dose of a pharmaceutical composition that contains an amount of the compound shown in Formula (I):



(I),

or a pharmaceutically acceptable salt thereof, wherein the composition contains a formulation of the compound suitable for administration into an osteoarthritic joint of a subject in need thereof; and wherein the formulation of the composition and the amount of the compound in the unit dose configure the unit dose to be effective in treating the osteoarthritic joint by decreasing the severity of one or more signs or symptoms of osteoarthritis in the joint without causing adverse effects when administered to the joint as a single dose.

Also provided herein is a product that comprises a unit dose of a pharmaceutical composition as disclosed herein and a package insert that describes the use and attendant benefits of the composition in treating osteoarthritis.

Also provided herein is a medical appliance or device containing a unit dose of a pharmaceutical composition as disclosed herein, wherein the appliance or device is configured for injecting the pharmaceutical composition it contains into an osteoarthritic joint.

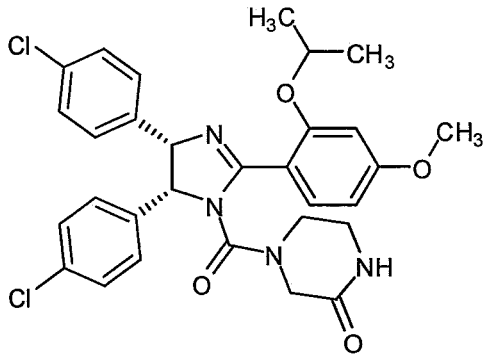
In the following description, certain specific details are set forth in order to provide a thorough understanding of various embodiments. However, one skilled in the art will understand that the invention may be practiced without these details. In other instances, well-known structures have not been shown or described in detail to avoid unnecessarily obscuring descriptions of the embodiments. Unless the context requires otherwise, throughout the specification and claims which follow, the word "comprise" and variations thereof, such as, "comprises" and "comprising," are to be construed in an open, inclusive sense, that is, as "including, but not limited to." In addition, the term "comprising" (and related terms such as "comprise" or "comprises" or "having" or "including") is not intended to exclude that in other certain embodiments, for example, an embodiment of any composition of matter, composition, method, or process, or the like, described herein, may "consist of" or "consist essentially of" the described features. Headings provided herein are for convenience only and do not interpret the scope or meaning of the claimed embodiments.

Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, the appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

Also, as used in this specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the content clearly dictates otherwise. Thus, for example, reference to "a non-human animal" may refer to one or more non-human animals, or a plurality of such animals, and reference to "a cell" or "the cell" includes reference to one or more cells and equivalents thereof (*e.g.*, plurality

CLAIMS

1. A unit dose of a pharmaceutical composition that contains an amount of the compound shown in Formula (I):



(I),

or a pharmaceutically acceptable salt thereof, wherein the composition contains a formulation of the compound suitable for administration into an osteoarthritic joint of a subject in need thereof; and wherein the formulation of the composition and the amount of the compound in the unit dose configure the unit dose to be effective in treating the osteoarthritic joint by decreasing the severity of one or more signs or symptoms of osteoarthritis in the joint without causing adverse effects when administered to the joint as a single dose.

2. The unit dose according to claim 1, wherein the pharmaceutical composition contains a hyaluronan.

3. The unit dose according to claim 1, wherein the formulation is a sustained release formulation.

4. The unit dose according to claim 3, wherein the sustained release formulation includes a gel, a polymeric matrix, or a microparticle.

5. The unit dose according to claim 1, which is effective in decreasing the severity of the one or more symptoms when administered as a single dose into the osteoarthritic joint followed by a non-treatment interval of at least two weeks.

6. The unit dose according to claim 1, which is effective for inhibiting erosion of a proteoglycan layer in the osteoarthritic joint when administered into the joint.

7. The unit dose according to claim 1, which results in production of collagen Type II in the osteoarthritic joint when administered into the joint.

8. A product that comprises a unit dose of a pharmaceutical composition according to claim 1 and a package insert that describes the use and attendant benefits of the composition in treating osteoarthritis.

9. A medical appliance or device containing a unit dose of a pharmaceutical composition according to claim 1, wherein the appliance or device is configured for injecting the pharmaceutical composition it contains into an osteoarthritic joint.

10. The unit dose according to claim 1, packaged in a kit containing a plurality of such doses.

11. The unit dose according to claim 1, wherein one of the signs that is decreased in severity as a result of being treated with the unit dose is production of the senescence-associated secretory phenotype (SASP) factor interleukin 6 (IL 6) or matrix metallopeptidase 3 (MMP3).

12. The unit dose according to claim 1, wherein one of the signs that is decreased in severity as a result of being treated with the unit dose is expression of the senescence marker p16.

13. The unit dose according to claim 1, wherein one of the signs that is decreased in severity as a result of being treated with the unit dose is a favoring of a contralateral unaffected joint in preference to the osteoarthritic joint.

14. The unit dose according to claim 1, wherein one of the symptoms that is decreased in severity as a result of being treated with the unit dose is pain experienced by the subject in the osteoarthritic joint.

15. The unit dose according to claim 1, which is effective in promoting production of collagen Type II in the osteoarthritic joint.