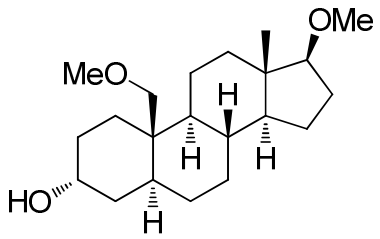
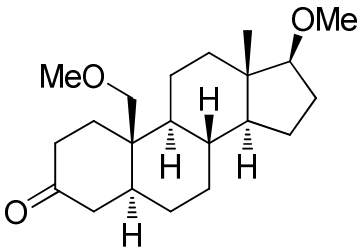


.

[0007b] In another aspect, there is provided a process for preparing a compound of the formula:

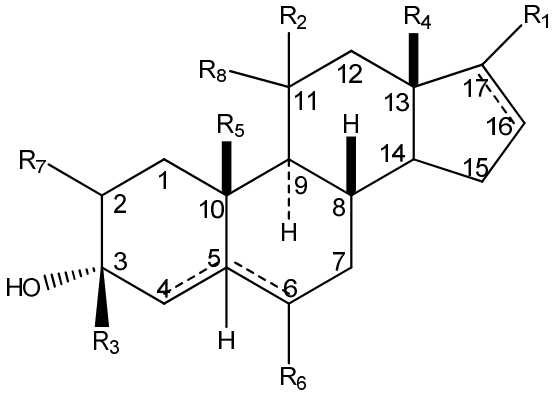


or a pharmaceutically acceptable salt thereof, comprising reducing (5α,17β)-17,19-dimethoxyandrostan-3-one having the structure:



or a pharmaceutically acceptable salt thereof.

[0008] In one example, the present disclosure is directed to a compound having a structure of Formula (I):



(I)

or a pharmaceutically acceptable salt thereof;

wherein:

[0009] R1 is selected from (C1-C4 alkyl)-O, spirooxirane, cyano, =O, nitro, (C1-C4 alkyl)C(O), and HO(C1-C4 alkyl)C(O), with R1 preferably being in the beta position when other than =O, and/or in one or more preferred embodiments C1-C4 alkyl being methyl, R1 therefore being is selected from methoxy, spirooxirane, cyano, =O, nitro, CH3C(O)- and OHCH2C(O)-;

[0010] R2 is =O, H, or ORa, where Ra is selected from H, optionally substituted C1-C4 alkyl, or optionally substituted aryl, with the proviso that when R2 is =O, R8 is not present;

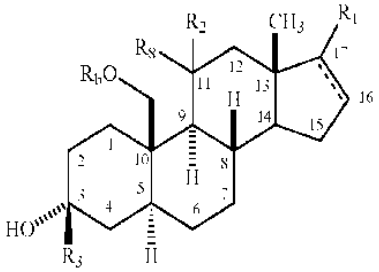
[0011] R3 is H, optionally substituted C1-C4 alkyl, optionally substituted C2-C4 alkenyl, optionally substituted C2-C4 alkynyl, or optionally substituted aryl;

[0012] R4 is independently selected from H and unsubstituted C1-C4 alkyl;

Claims

What is claimed is:

1. A process for preparing a sterol of Formula (I-g):



(I-g)

or a pharmaceutically acceptable salt thereof,

wherein:

R_1 is (C_1-C_4 alkyl)-O, spirooxirane, cyano, =O, nitro, (C_1-C_4 alkyl)C(O), or HO(C_1-C_4 alkyl)C(O);

R_2 is =O, H, or OR_a, where R_a is H, optionally substituted C_1-C_4 alkyl, or optionally substituted aryl, with the proviso that when R_2 is =O, R_8 is not present;

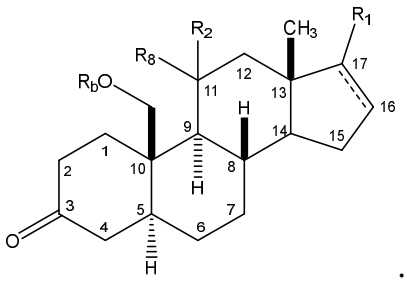
R_3 is H, optionally substituted C_1-C_4 alkyl, optionally substituted C_2-C_4 alkenyl, optionally substituted C_2-C_4 alkynyl, or optionally substituted aryl;

R_b is methyl;

R_8, when present, is H or optionally substituted C_1-C_4 alkyl; and

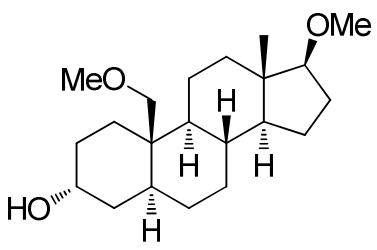
- - - denotes an optional, additional C-C bond, resulting in a C=C bond between C_{16}-C_{17}, with the proviso that when present, the R_1 is not =O or spirooxirane;

the process comprising reducing a ketone form thereof having the structure:

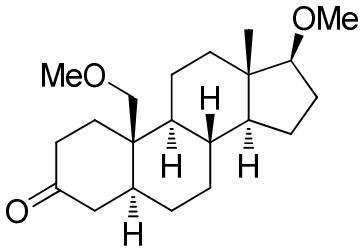


.

2. A process for preparing a compound of the formula:

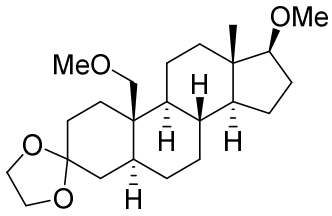


or a pharmaceutically acceptable salt thereof, comprising reducing (5α,17β)-17,19-dimethoxyandrostan-3-one having the structure:



or a pharmaceutically acceptable salt thereof.

3. The process of claim 2, further comprising reacting compound (5α,17β)-17,19-dimethoxyandrostan-3-one, cyclic 1,2-ethandiyl acetal having the structure:

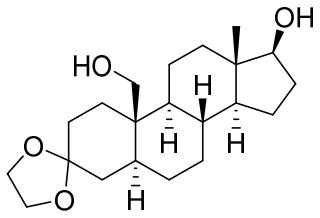


,

or a pharmaceutically acceptable salt thereof,

with p-toluenesulfonic acid (PTSA) to form (5α,17β)-17,19-dimethoxyandrostan-3-one, or a pharmaceutically acceptable salt thereof.

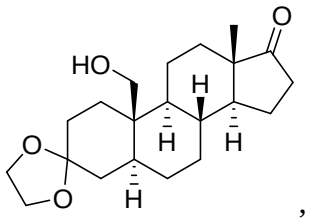
4. The process of claim 3, further comprising reacting compound (5α,17β)-17,17-dihydroxyandrostan-3-one, cyclic 1,2-ethandiyl acetal having the structure:



,

or a pharmaceutically acceptable salt thereof, with sodium hydride in the presence of iodomethane to form (5α,17β)-17,19-dimethoxyandrostan-3-one, cyclic 1,2-ethandiyl acetal.

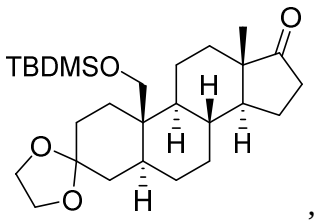
5. The process of claim 4, further comprising reacting compound (5α)-19-hydroxyandrostane-3,17-dione, 3-cyclic 1,2-ethandiyl acetal having the structure:



,

or a pharmaceutically acceptable salt thereof, with sodium borohydride to form (5α,17β)-17,17-dihydroxyandrostan-3-one, cyclic 1,2-ethandiyl acetal or a pharmaceutically acceptable salt thereof.

6. The process of claim 4, further comprising deprotecting compound (5α)-19-[[(dimethylethyl)dimethylsilyl]oxy]-androstane-3,17-dione, 3-cyclic 1,2-ethandiyl acetal, having the structure:



,

or a pharmaceutically acceptable salt thereof, to form (5α)-19-hydroxyandrostane-3,17-dione, 3-cyclic 1,2-ethandiyl acetal.

7. The process of claim 6, wherein the deprotection of (5α)-19-[[(dimethylethyl)dimethylsilyl]oxy]-androstane-3,17-dione, 3-cyclic 1,2-ethandiyl acetal or a pharmaceutically acceptable salt thereof comprises contacting (5α)-19-[[(dimethylethyl)dimethylsilyl]oxy]-androstane-3,17-dione, 3-cyclic 1,2-ethandiyl acetal or the salt thereof with tetrabutylammonium fluoride (TBAF).