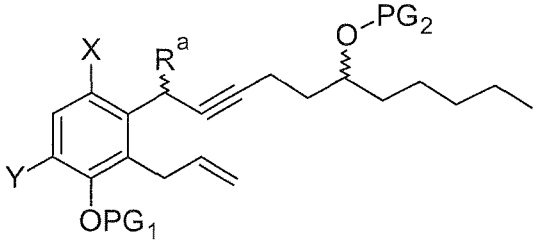
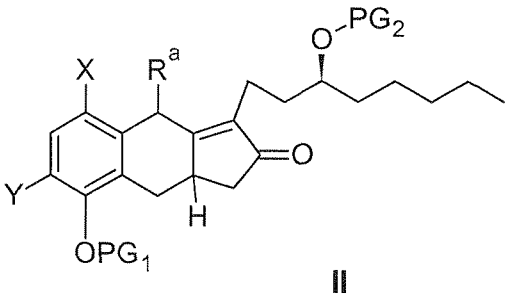
to using a silyl protective group for the non-benzylic alcohol moiety of the C-11 side-chain.

In one aspect, there is provided a compound of formula I, formula II, formula IIb, formula IIIb, or formula IVb



I



II

wherein

X is Br and **Y** is H; and

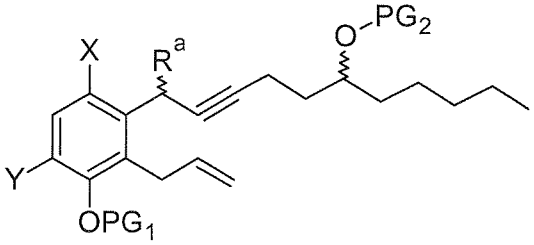
PG_1 is selected from the group consisting of methyl, methoxymethyl, benzyloxymethyl, methoxyethoxymethyl, benzyl, 4-methoxybenzyl, 2,6-dichlorobenzyl, 3,4-dichloro-benzyl; $-CH_2COOH$, $-CH_2COOR_x$, and $-CH_2CH_2OPG_2$; and

PG_2 is TBDMS; and

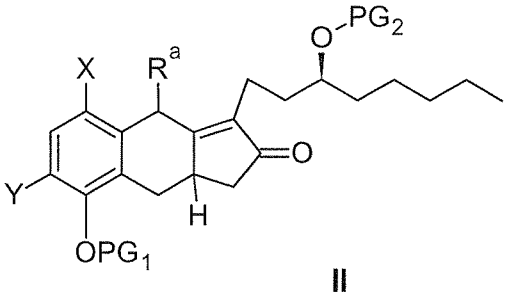
R^a is hydroxy; and

R_x is C_{1-4}alkyl or aryl.

In another aspect, there is provided a compound of formula I, or formula II,



I



II

wherein

X is Br and **Y** is H; and

PG_1 is selected from the group consisting of methyl, methoxymethyl, benzyloxymethyl, methoxyethoxymethyl, benzyl, 4-methoxybenzyl, 2,6-dichlorobenzyl, 3,4-dichloro-benzyl; $-CH_2COOH$, $-CH_2COOR_x$, and $-CH_2CH_2OPG_2$; and

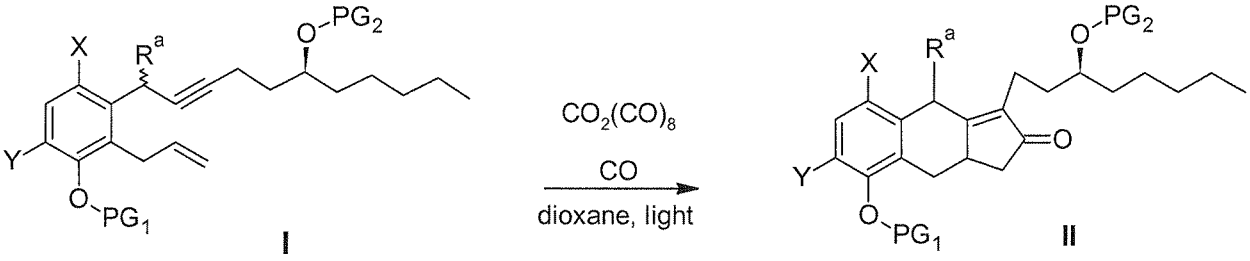
PG_2 is THP, $SiR_1R_2R_3$; or $-CH_2OR_x$; and

R_1, R_2, and **R_3** are independently from one another selected from the group consisting of methyl, isopropyl, *t*-butyl, and phenyl

R^a is hydroxy; and

R_x is C_{1-4}alkyl or aryl.

In another aspect, there is provided a process for making a compound of formula (II), comprising the following step:



I II

wherein

X, Y, R^a, PG_1 and **PG_2** are as defined above.

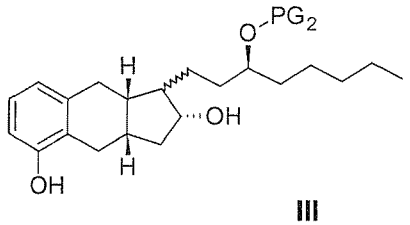
In another aspect, there is provided a process for making a compound of formula IV, comprising the steps of

a) hydrogenating and reducing a compound of formula II as defined herein to obtain racemic compound

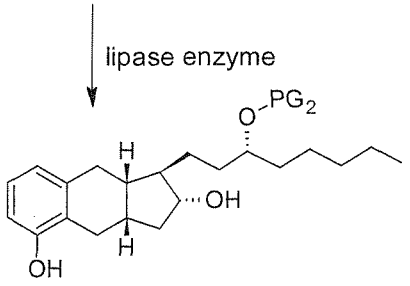
of formula III;

b) contacting racemic compound of formula III with lipase enzyme in the presence of a solvent; and

c) obtaining an optically pure compound IV;



III

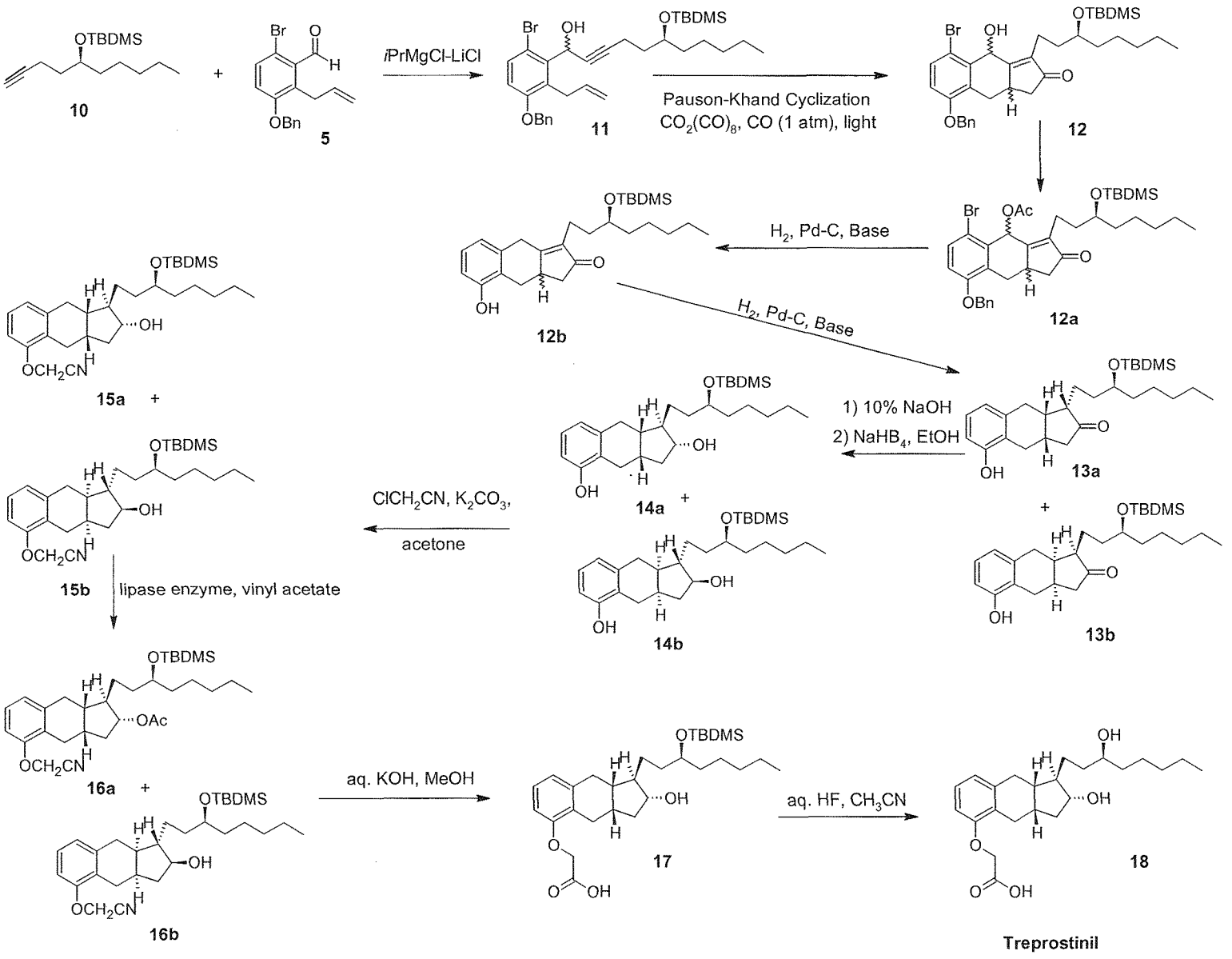


IV

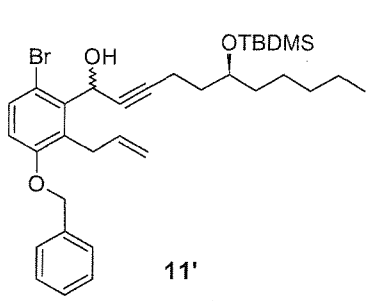
wherein

PG_2 is THP or TBDMS.

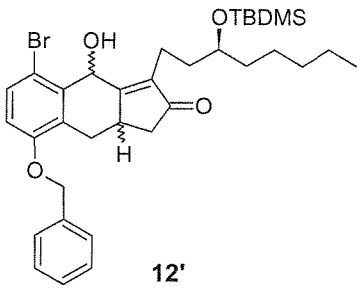
In another aspect, there is provided a process for making treprostinil (**18**) comprising the following steps:


OTBDMS
10
Br
O
H
OBn
5
iPrMgCl-LiCl
OH
11
Pauson-Khand Cyclization
CO2(CO)8, CO (1 atm), light
12
OAc
12a
H2, Pd-C, Base
12b
H2, Pd-C, Base
1) 10% NaOH
2) NaHB4, EtOH
13a
13b
14a
14b
ClCH2CN, K2CO3,
acetone
15a
15b
lipase enzyme, vinyl acetate
16a
16b
aq. KOH, MeOH
17
aq. HF, CH3CN
18
Treprostinil

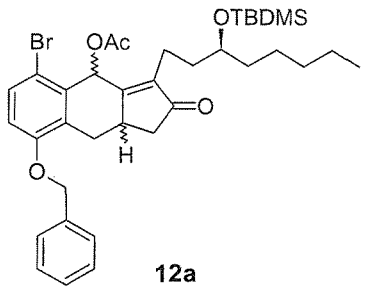
In another aspect, there is provided a new intermediate compound selected from the group consisting of



11'



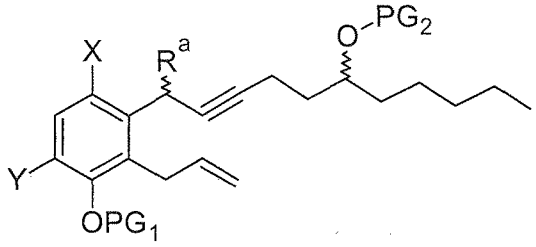
12'



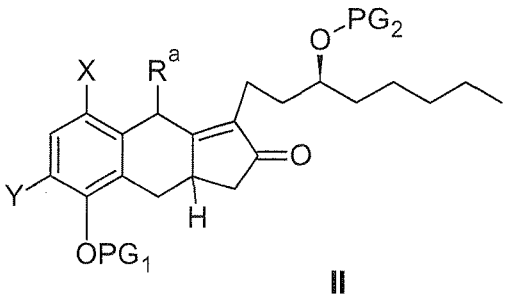
12a

Claims :

1. A compound of formula I, formula II or formula IVb



I



II

wherein

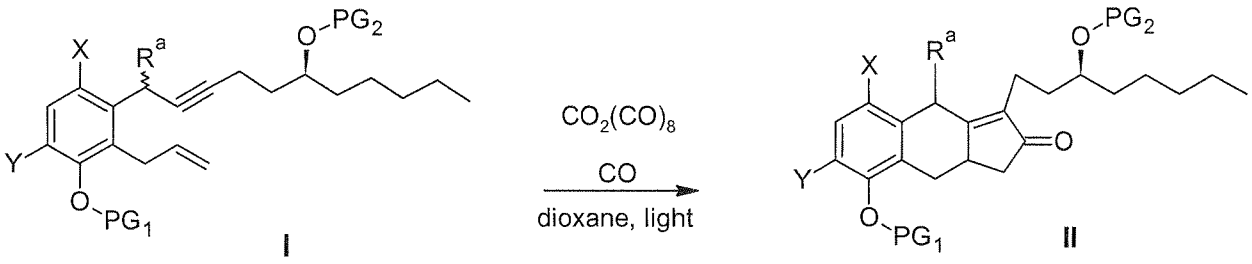
X is Br and **Y** is H; and

PG_1 is selected from the group consisting of methyl, methoxymethyl, benzyloxymethyl, methoxyethoxymethyl, benzyl, 4-methoxybenzyl, 2,6-dichlorobenzyl, 3,4-dichloro-benzyl; $-CH_2COOH$, $-CH_2COOR_x$, and $-CH_2CH_2OPG_2$; and

PG_2 is TBDMS; and

R^a is hydroxy; and

R_x is C_{1-4}alkyl or aryl.



wherein

X, Y, R^a, PG_1 and **PG_2** are as defined in claim 1.

4. The process according to claim 3, wherein **Y** is hydrogen, and **PG_1** is benzyl.

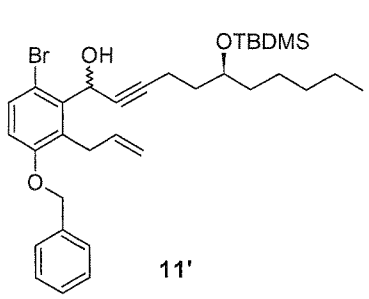
5. A process for making a compound of formula IV, comprising the steps of

a) hydrogenating and reducing a compound of formula II according to claim 3 to obtain racemic compound of formula III;

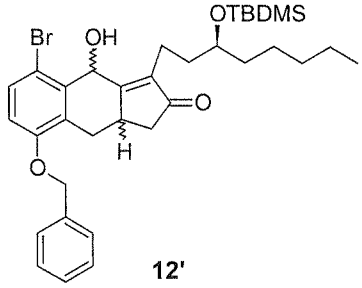
b) contacting racemic compound of formula III with lipase enzyme in the presence of a solvent; and

c) obtaining an optically pure compound IV;

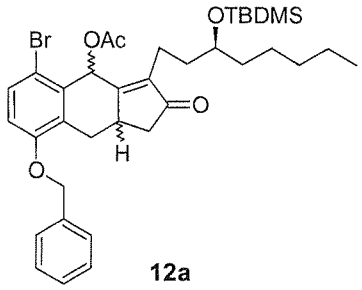
9. A new intermediate compound selected from the group consisting of



11'



12'



12a

5