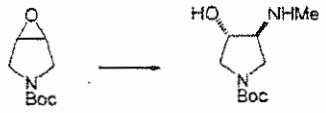
comprising SNS-595 and *N*-desmethyl-SNS-595. In one embodiment, provided herein is a process for preparing intermediates useful in the preparation of SNS-595.

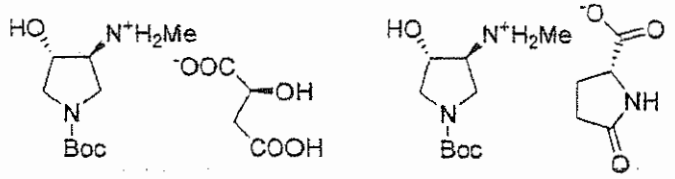
[0011a] In one aspect, there is provided a process for preparing (+)-1,4-dihydro-7-[(3S,4S)-3-methoxy-4-(methylamino)-1-pyrrolidinyl]-4-oxo-1-(2-thiazolyl)-1,8-naphthyridine-3-carboxylic acid comprising:

i) epoxide opening Compound 3 with methylamine to obtain Compound 4,



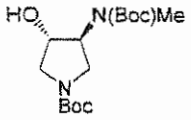
3 4

ii) resolving Compound 4 with a chiral acid selected from L-(-)-malic acid and L-(-)-pyroglutamic acid to provide Compound 5A or 5B



5A or 5B ,

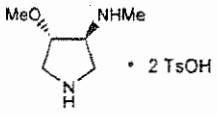
iii) protecting the secondary amine of Compound 5A or 5B with *tert*-butoxycarbonyl



protecting group to provide compound 6 6 ,

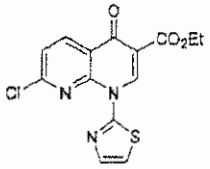
iv) methylating the free hydroxyl group of Compound 6 with a methylating agent,

v) deprotecting the amino groups with *p*-toluene sulfonic acid monohydrate to obtain Compound 8



8 and

vi) reacting Compound 8 with Compound 10



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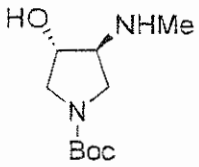
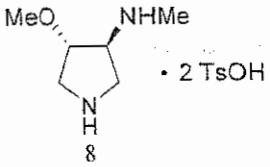
to obtain (+)-1,4-dihydro-7-[(3*S*,4*S*)-3-methoxy-4-(methylamino)-1-pyrrolidinyl]-4-oxo-1-(2-thiazolyl)-1,8-naphthyridine-3-carboxylic acid.

[0011b] In one aspect, there is provided a process for resolution of Compound 4 comprising reacting Compound 4 with a chiral acid selected from L -(-)- malic acid and L -(-)-pyroglutamic acid, where Compound 4 is



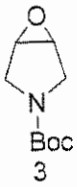
4

[0011c] In one aspect, there is provided a process for preparation of Compound 8 comprising:



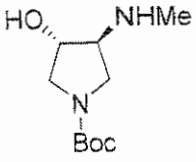
8

i) epoxide opening Compound 3



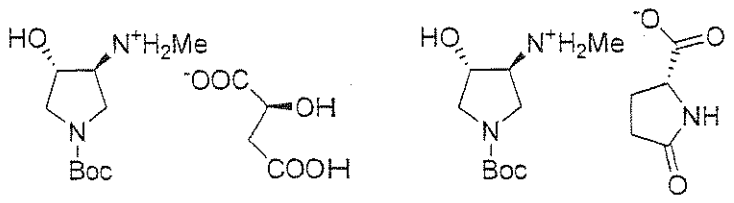
3

with methylamine to obtain Compound 4



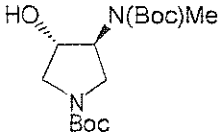
4

ii) resolving Compound 4 with a chiral acid selected from L-(-)-malic acid and L-(-)-pyroglutamic acid to provide Compound 5A or 5B



5A or 5B ,

iii) protecting the secondary amine of Compound 5A or 5B with *tert*-butoxycarbonyl protecting group to provide compound 6



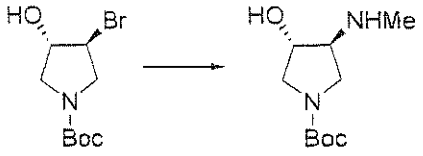
6 ,

iv) methylating the free hydroxyl group of Compound 6 with a methylating agent, and

v) deprotecting the amino groups with *p*-toluene sulfonic acid monohydrate to obtain Compound 8.

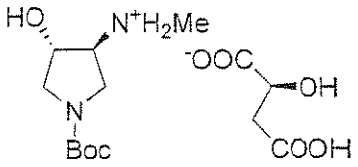
[0011d] In one aspect, there is provided a process for preparing (+)-1,4-dihydro-7-[(3S,4S)-3-methoxy-4-(methylamino)-1-pyrrolidinyl]-4-oxo-1-(2-thiazolyl)-1,8-naphthyridine-3-carboxylic acid comprising:

i) reacting Compound 2 with methylamine and a base to obtain Compound 4



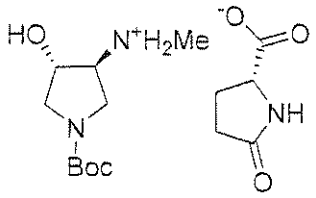
2 4 ,

ii) resolving Compound 4 with a chiral acid selected from L-(-)-malic acid and L-(-)-pyroglutamic acid to provide Compound 5A or 5B



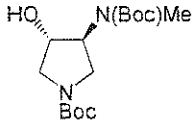
5A

or



5B ,

iii) protecting the secondary amine of Compound 5A or 5B with *tert*-butoxycarbonyl

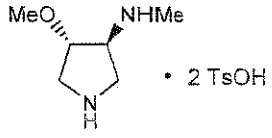


6

protecting group to provide compound 6 ,

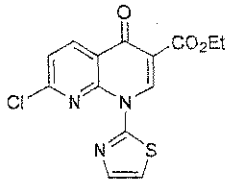
iv) methylating the free hydroxyl group of Compound 6 with a methylating agent, and

v) deprotecting the amino groups with *p*-toluene sulfonic acid monohydrate to obtain Compound 8



8 , and

vi) reacting Compound 8 with Compound 10



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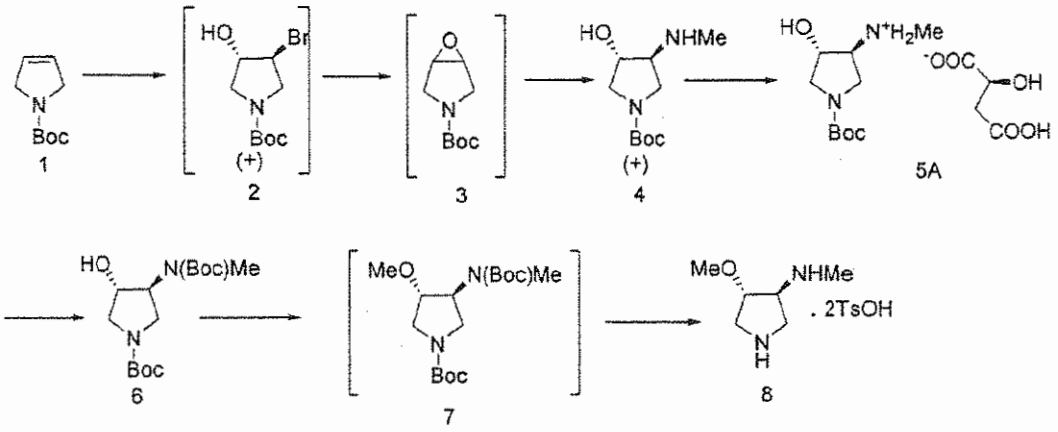
to obtain (+)-1,4-dihydro-7-[(3*S*,4*S*)-3-methoxy-4-(methylamino)-1-pyrrolidinyl]-4-oxo-1-(2-thiazolyl)-1,8-naphthyridine-3-carboxylic acid.

[0012] In one embodiment, provided herein is a process for preparing SNS-595 as illustrated in Schemes 1 and 2.

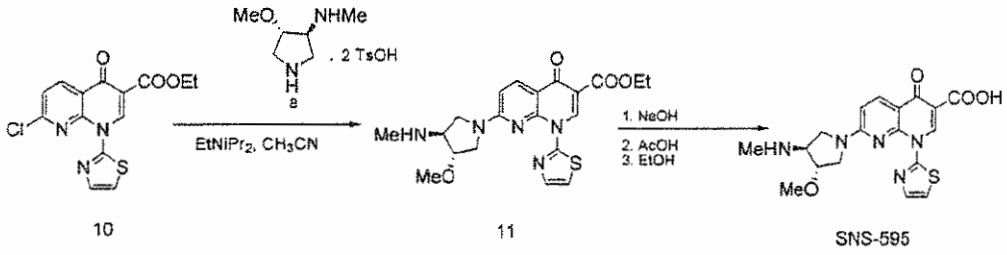
Scheme 1



[0013] In this route, Compound 4 is obtained by nucleophilic opening of epoxide (Compound 3) by methylamine, thereby eliminating the impurities resulting from incomplete methylation. In certain embodiments, Compound 2 is directly converted to Compound 4 by treatment with methylamine and a base, such as sodium bicarbonate. Compound 4 is resolved by reaction with a chiral acid, such as L-(-)-malic acid or L-(-)-pyroglutamic acid to form a chiral salt.

[0014] Compound 8, prepared according to Scheme 1 or otherwise, is then reacted with 7-chloro-4-oxo-1-thiazol-2-yl-1,4-dihydro-[1,8]naphthyridine-3-carboxylic acid ethyl ester to obtain SNS-595 as illustrated in Scheme 2.

Scheme 2



[0015] In certain embodiments, processes provided herein yield compositions comprising at least about 99.5% SNS-595 and less than about 0.5% of impurity by total weight of the composition, wherein the percentage is based upon total weight of the composition. In certain embodiments, the compositions comprise at least about 99.5% SNS-595 and less than about 0.5% *N*-desmethyl-SNS-595 by total weight of the