Specification

Title of Invention:

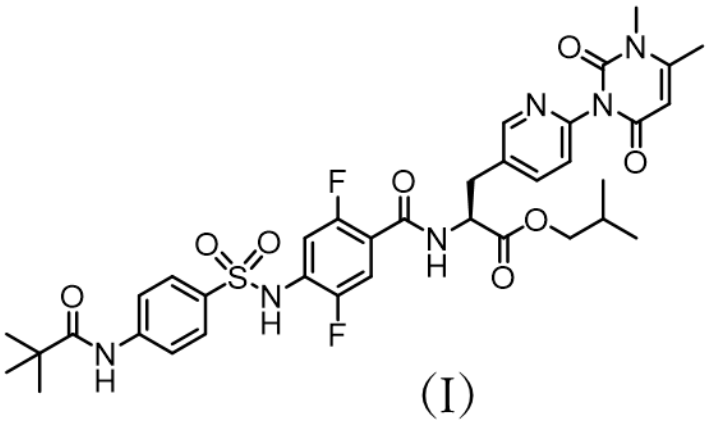
METHOD FOR PRODUCING COMPOUND OR PHARMACEUTICALLY ACCEPTABLE SALT THEREOF

Technical Field

The present invention relates to a method for producing a compound or a pharmaceutically acceptable salt thereof.

Background Art

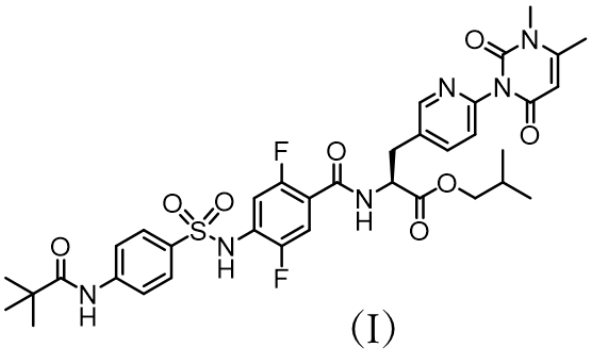
A compound represented by the following Formula (I) (hereinafter also simply referred to as Compound I) or a pharmaceutically acceptable salt thereof has an α4 integrin inhibitory effect and is expected to be used in pharmaceutical applications and so on (International Publication No. WO2017/135472: Patent Literature 1). Patent Literature 1 describes a synthesis of Compound I in a specific method including purification with reversed-phase HPLC.



(I)

Summary

In an aspect of the present disclosure, there is provided a method for producing a compound of the following Formula (I) or a pharmaceutically acceptable salt thereof:



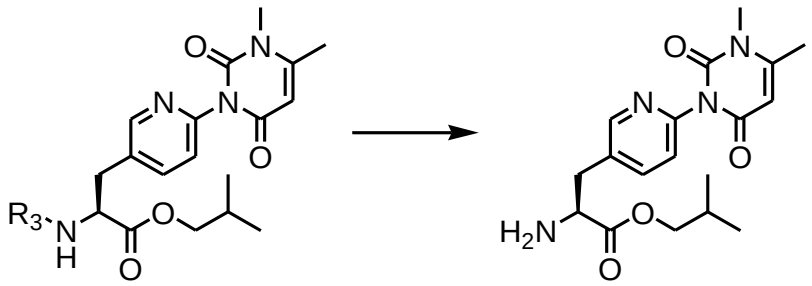
(I)

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the method comprising:

a step (d-1) of preparing a compound 16 solution by deprotecting a compound 10-R_3 in a solvent according to the following scheme (d-1):

Scheme (d-1)

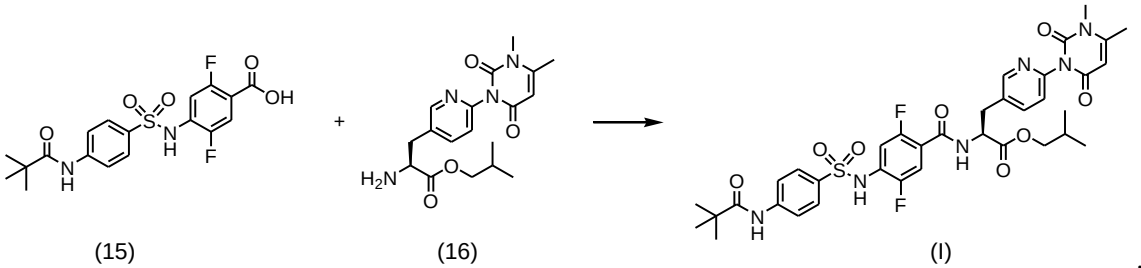


(10-R_3) (16)

(wherein R_3 denotes a protecting group for amino group); and

a step (d-2) of adding a compound 15 to the compound 16 solution without the compound 16 isolated, and thereby synthesizing the compound of Formula (I) in the presence of a condensing agent according to the following scheme (d-2):

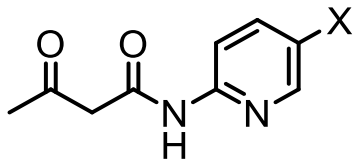
Scheme (d-2)



(15) (16) (I)

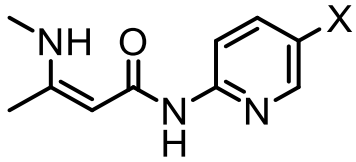
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In another aspect of the present disclosure, there is provided a compound represented by the following formula or a salt thereof:



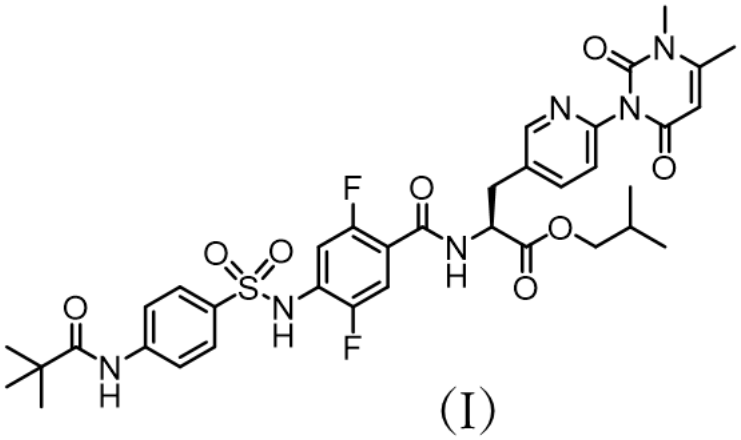
(wherein X denotes a halogen atom or triflate).

In a further aspect of the present disclosure, there is provided a compound represented by the following formula or a salt thereof:



(wherein X denotes a halogen atom or triflate).

In another aspect of the present disclosure, there is provided a crystal of a compound of the following Formula (I) or a pharmaceutically acceptable salt thereof:



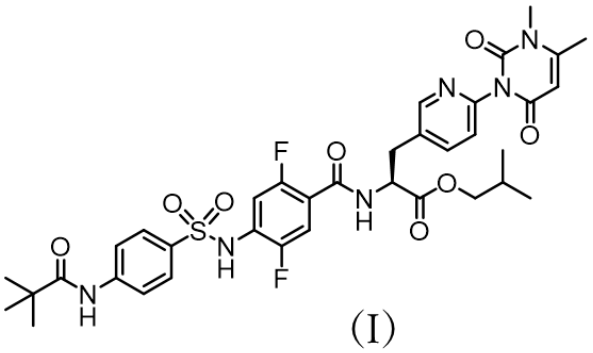
(I)

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The method for synthesizing a sulfonamide derivative represented by Compound I described in Patent Literature 1 requires column purification such as reversed-phase HPLC, and has room for further improvement in terms of productivity. Therefore, an object of the present disclosure is to provide a technique capable of improving the productivity in a method for producing a sulfonamide derivative represented by Compound I or a pharmaceutically acceptable salt thereof.

The present inventors found that the above object can be achieved by a specific method. Specifically, for example, the present disclosure provides the following matters.

(1) A method for producing a compound of the following Formula (I) or a pharmaceutically acceptable salt thereof:



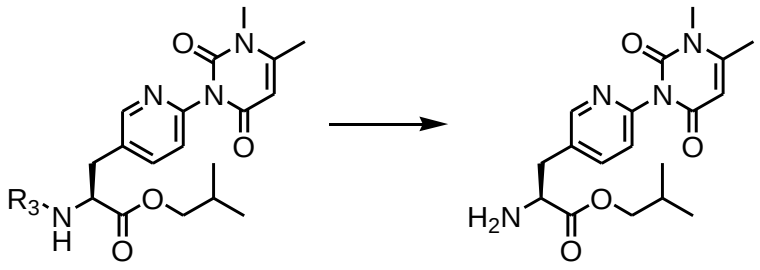
(I)

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the method comprising:

a step (d-1) of preparing a compound 16 solution by deprotecting a compound 10-R_3 in a solvent according to the following scheme (d-1):

Scheme (d-1)



(10-R_3) (16)

(wherein R_3 denotes a protecting group for amino group); and

a step (d-2) of adding a compound 15 to the compound 16 solution without isolating the compound 16, and thereby synthesizing the compound of Formula (I) in the presence of a condensing agent according to the following scheme (d-2):

Scheme (d-2)

17.4°±0.2°, and

19.8°±0.2°.

According to the present disclosure, provided is a technique capable of improving the productivity in a method for producing a sulfonamide derivative represented by Compound I or a pharmaceutically acceptable salt thereof.

Brief Description of Drawings

Fig. 1 is a schematic diagram illustrating an entire image of a method for producing a compound I.

Fig. 2 is a diagram illustrating an X-ray diffraction pattern of a crystal A.

Fig. 3 is a diagram illustrating an X-ray diffraction pattern of a crystal B.

Fig. 4 is a diagram illustrating an X-ray diffraction pattern of a crystal C.

Description of Embodiments

Definitions

As used herein, "an alkyl group" means a functional group obtained by removing one hydrogen atom from an alkane (including a cycloalkane). The alkyl groups include linear, branched, and cyclic alkyl groups. Examples of the alkyl groups include a methyl group, an ethyl group, an n-propyl group, an isopropyl group, an n-butyl group, an isobutyl group, a tert-butyl group, an n-pentyl group, a neopentyl group, an n-hexyl group, and so on.

As used herein, "a halogen atom" means an atom of an element in group 17 of the periodic table. Examples of the halogen atom include a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, and so on.

As used herein, "an alcohol having 1 to 4 carbon atoms" means an alcohol whose number of carbon atoms is 1 to 4. Examples of the "alcohol having 1 to 4 carbon atoms" include methanol, ethanol, isopropanol, n-butanol, isobutanol, and so on.

As used herein, "a ketone solvent" means a solvent of a compound having a ketone structure in its molecule. The ketone solvent may be acetone, methyl ethyl ketone, or the like.